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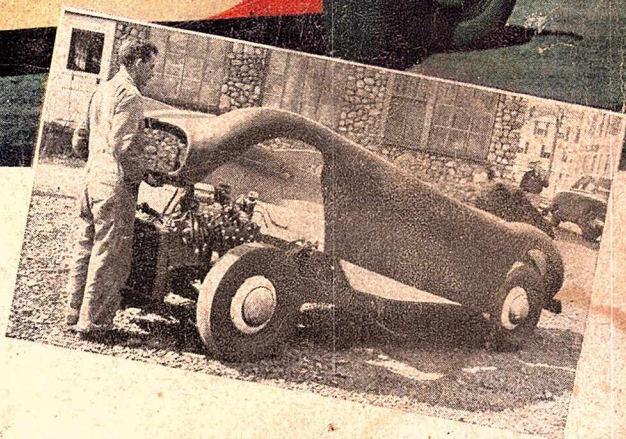
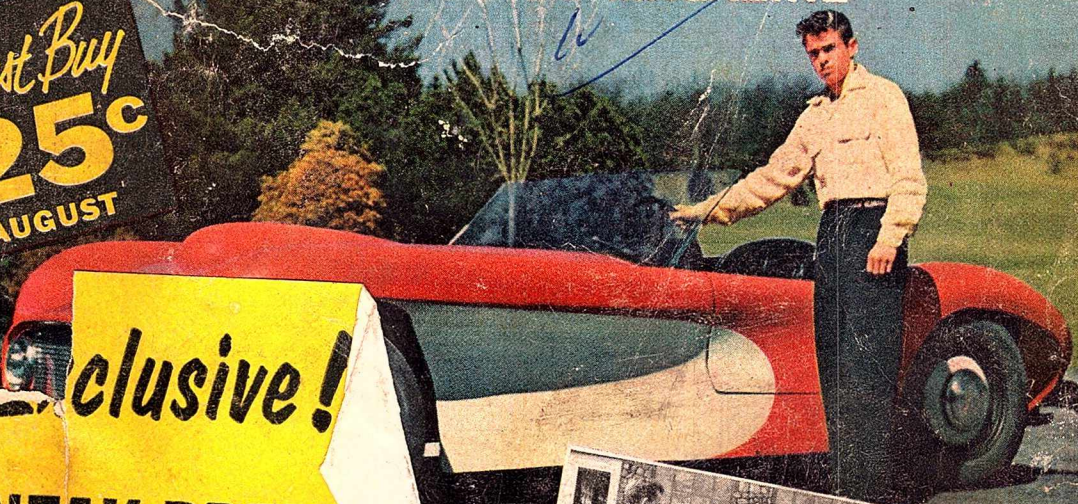
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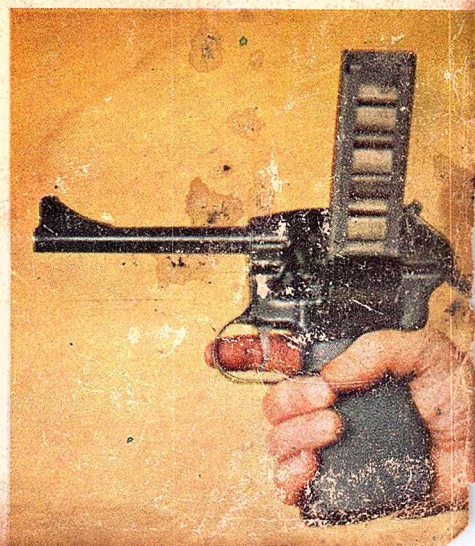
**SNEAK PREVIEW
OF THE
1958 CARS**

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→
**SENSATIONAL NEW
20-SHOT REVOLVER
FIRES TRIANGULAR
CARTRIDGES • Page 80**

←
**UNIQUE, LOW-COST
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PLANETS • Page 152**



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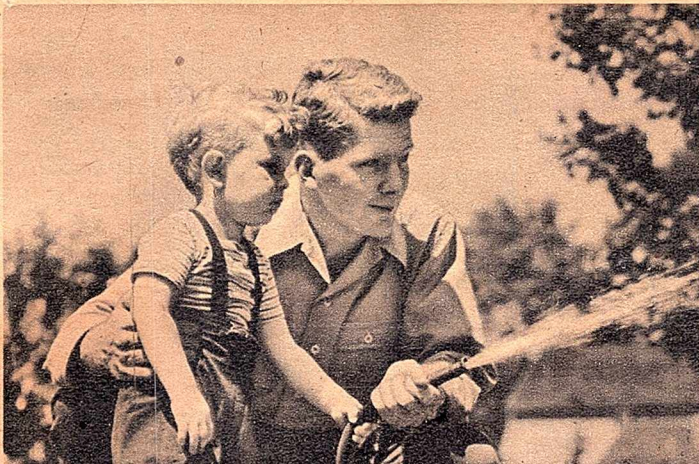
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This man is a "security risk"!

Age, 29. Married. Two children. High school education. Active in local lodge, church, veterans' organization. Employed by large manufacturing concern. Earns \$82 a week.

SOUNDS like an Average Joe. And he is. Too average! He's got a job. It pays fairly well. He's satisfied.

But here's the catch. With the right kind of training, this young

man could be stepping into better jobs. He could be making \$7-8000 a year. He could be cashing in on those spare-time hours he now wastes.

As it stands now, he's stuck in his job. Can't seem to make any headway. He's reluctant to try. So he just hangs on.

This man is a "Security Risk" to his wife and children.

His family probably will never enjoy the comforts, the prestige, the good living that could be theirs. If hard times come, they are almost sure to be hurt. For an Average Joe can't expect to compete with trained men when the chips are down.

A man like this would do well to start a planned program of self-improvement. In his spare time. In a field related to his interests and abilities. Right NOW!

One good way to start—a way proved by hundreds of thousands of once-Average Joes who are making good today—is to enroll for special training with a recognized correspondence school. One like I. C. S., the oldest and largest in the world.

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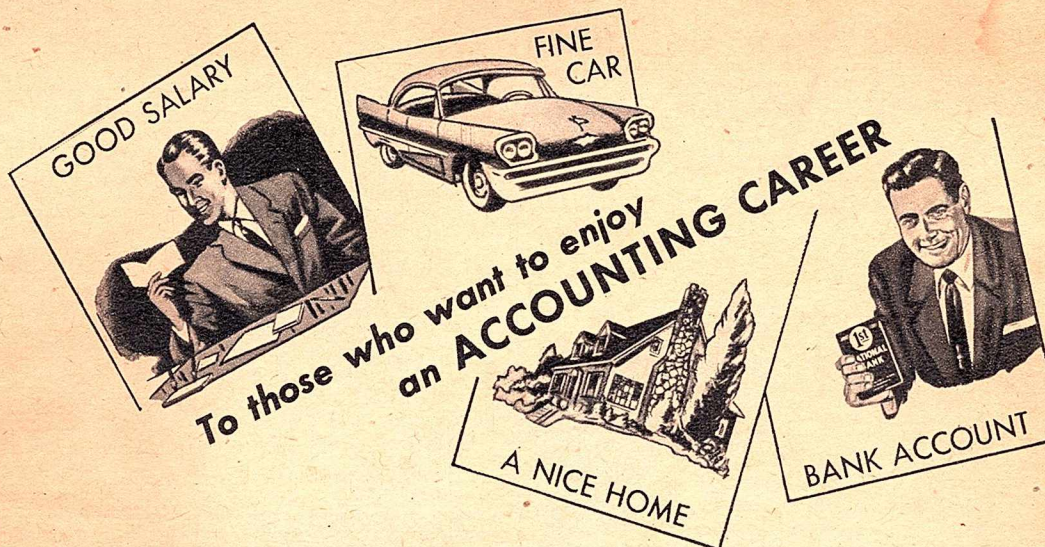
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Cover photos: Sports car by Rudy Arnold
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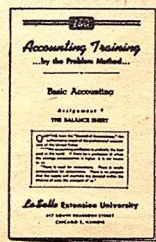
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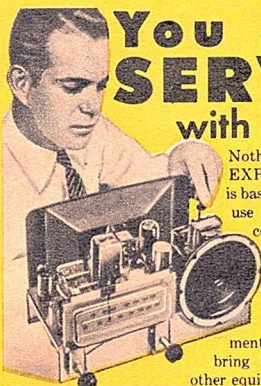
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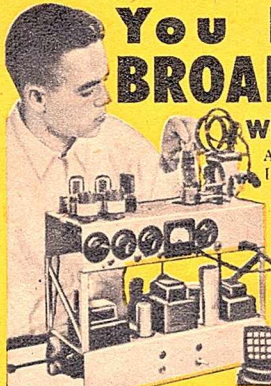
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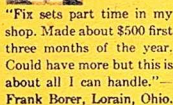
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I TRAINED THESE MEN



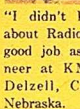
"I have progressed very rapidly. My present position is Studio Supervisor with KEDD Television, Wichita."—Elmer Frewaldt, 3026 Stadium, Wichita, Kans.



"Fix sets part time in my shop. Made about \$500 first three months of the year. Could have more but this is about all I can handle."—Frank Borer, Lorain, Ohio.



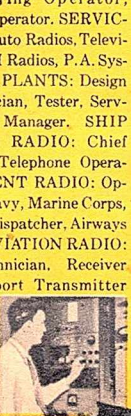
"I've come a long way in Radio and Television since graduating. Have my own business on Main Street."—Joe Travers, Asbury Park, New Jersey.



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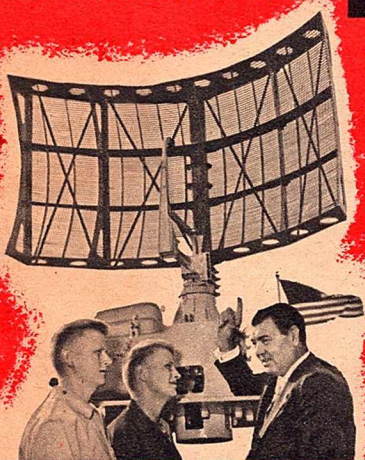
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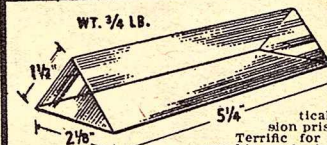
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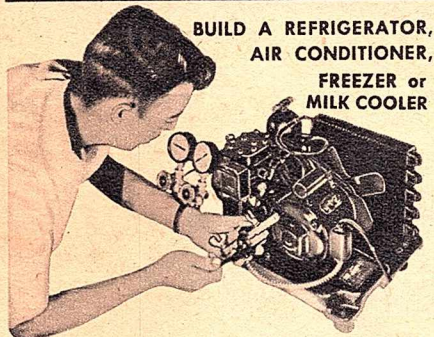
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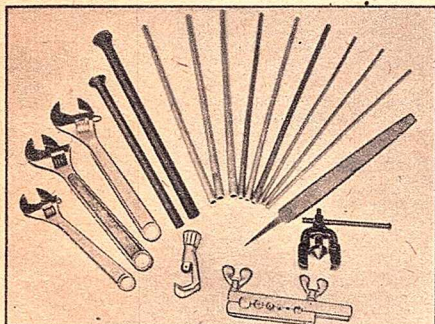
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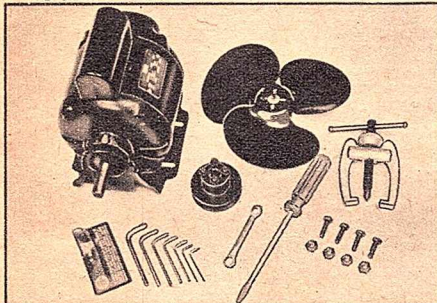
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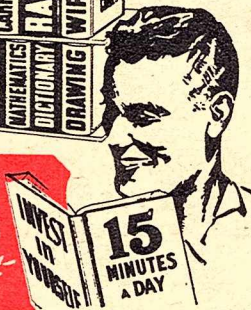


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DO YOU LIKE TO DRAW? If you do—America's 12 Most Famous Artists are looking for you. We want you to test your art talent!

Too many people miss a wonderful career in art—simply because they don't think they have talent. But my colleagues and I have helped thousands of people get started. Like these—

Don Smith lives in New Orleans. Three years ago Don knew nothing about art—even doubted he had talent. Today, he is an illustrator with a leading advertising agency in the South—and has a future as big as he wants to make it.

Harriet Kuzniewski was bored with an "ordinary" job when she sent for our talent test. Once convinced that she had the makings of an artist—she started to study art at home. Soon she was offered a job as a fashion artist. A year later, she became assistant art director of a big buying office.

Pipe-fitter to Artist

John Busketta is another. He was a pipe-fitter's helper with a big gas company—until he decided to do something about his urge to draw. He still works for the same company—but as an artist in the advertising department. At a big increase in pay!

Don Golemba of Detroit stepped up from railroad worker to the styling department of a major automobile company. Now he helps design new car models!

Salesgirl, Clerk, and Father of Three Win New Careers

A West Virginia salesgirl studied with us, got a job as an artist, later became advertising manager of the best store in Charleston.

John Whitaker of Memphis, Tenn., was an airline clerk when

he began studying with us. Two years later, he won a national cartooning contest. Recently, a huge syndicate signed him to do a daily comic strip.

Stanley Bowen—a married man with three children, unhappy in a dead-end job—switched to a great new career in art. Now he's one of the happiest men you'll ever meet!

Profitable Hobby—at 72

A great-grandmother in Newark, Ohio, decided to use her spare time to study painting. Recently, she had her first local "one man" show—where she sold thirty-two water colors and five oil paintings.

Cowboy Starts Art Business

Donald Kern—a cowboy from Miles City, Montana—studied art with us. Now he paints portraits and sells them for \$250 each. And he gets all the business he can handle.

Gertrude Vander Poel had never drawn a thing until she started studying with us. Now a swank New York gallery exhibits her paintings for sale.

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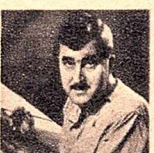
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The world's largest car rental organization, Hertz Corp. of Chicago, will inaugurate a Rent-A-Plane service next fall. Three types of Cessna aircraft will be available to pilots and charter customers at 50 airports throughout the U. S.

It is reported that electronic engineers are now working on an "automatic chauffeur" which, at the press of a button inside the house, will open the garage door, start the family car and wheel it out onto the driveway.

Edward L. Bortz, former president of the American Medical Association, predicts that in the future man will attain a life span of 125 to 150 years. The normal life span of animals is six times the period required for completion of physical growth—which in man is 25 years.

Physicists at the Holloman Air Development Center, N. M., are designing the world's largest solar furnace. It is expected to be completed in 1959 and will produce temperatures as high as 8,000° F—about 70 per cent of the temperature of the sun's surface.

By 1960 owners of high-performance cars will have to buy premium gasoline rated at 110 octane. This was the prediction of S. P. Blumberg of the Humble Oil & Refining Co., Baytown, Texas. Mr. Blumberg also predicted that the percentage of cars requiring high octane fuels will be much higher in 1960 than at present. Present premium gasolines have 95 to 100 octane.

A method has been developed whereby ordinary red brick clay can be made to take on virtually all the colors of the rainbow. The colored bricks are a result of research at the School of Engineering, North Carolina State College, Raleigh, N. C. They can be manufactured at a surprisingly low cost from typical red clay.

Rocket airliners that achieve speeds of 8,000 mph are only 30 or 40 years away, according to Dr. Louis Ridenour, former chief scientist for the Air Force. Dr. Ridenour predicts the huge, windowless passenger rockets will travel at altitudes of 700 miles above the earth. A crew will be present but flight will probably be automatically controlled.

A team of French biologists has managed, through chemical injections made after birth, to produce radical physical changes in ducks. They predict that the same technique may some day be used to produce beneficial physical changes in humans. Studies are continuing to determine if the new characteristics are handed down to succeeding generations.

We will have a four-day work week within the next 20 years, according to August Hecksher, director of the Twentieth Century Fund. Automation and increased mechanization will also result in longer vacations and a shorter span of working years.

New experiments in the development of "anti-insanity shots" were reported to the American Psychiatric Association. The treatment consists in giving injections of an extract from the brain "pleasure centers" of cattle to schizophrenic patients.

Gasoline-powered cars will begin disappearing within ten years, according to R. B. Venning, president of the Ontario Motor League, Canada. Greatly lessened petroleum reserves may lead to the development of electric or nuclear-powered autos, said Mr. Venning.

Soviet doctors are working on a method of correcting near-sightedness and other eye ailments by passing a weak electric current through the eyes. Communist researchers report they have fully restored normal vision after 20 treatments.

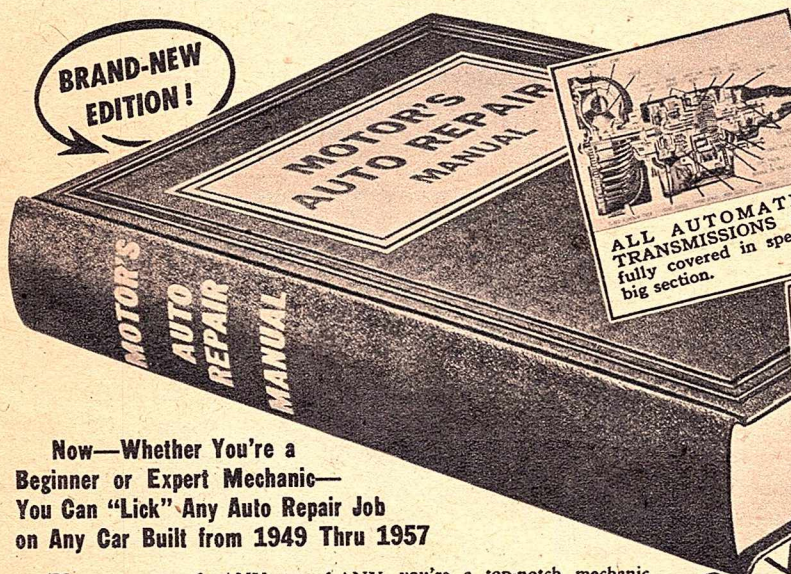
A new television screen that permits bright daylight viewing and may be the forerunner of three-dimensional TV has been developed at the Naval Research Laboratory in Washington. The new tube has a thin, transparent film of phosphor on the picture tube instead of the opaque powder now used.

—Lawrence Sanders

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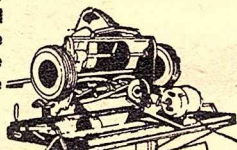
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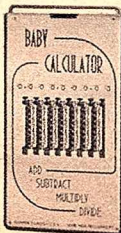
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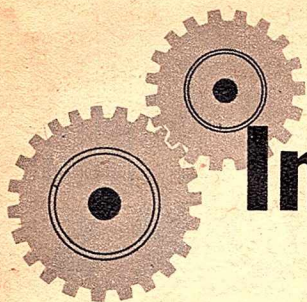
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Invention Clinic

Joseph H. Kraus

In this column each month Mr. Kraus will answer as many letters as space permits on those subjects he feels to be of widest general interest. Time does not allow him to reply to any letters except those printed here. Address your questions to the Invention Clinic, *Mechanix Illustrated*, 67 West 44 St., New York 36, N. Y.

Wire Installation System

J. C. Curry of Las Cruces, N. M., sends a diagram and description of a tool to attach wire rapidly against wood, plaster or metal surfaces. What do we think of its possibilities?

The tool would function provided the means for fixing the wires could be developed. You have given no information about the fixative. You may find that the rollers, reservoir and handle need to be shifted for proper functioning. You may not be able to do this until you decide what combination you intend to use. We recommend that the movement of the feed and fixing be in the same direction. In your design you have them working in opposite directions. This may demand a two-hand operation when one is possible. Before applying for a patent we recommend a complete test. Meanwhile ask

your attorney for a report on a search.

Once Bitten

Carl F. Smith of Little Genesee, N. Y., once asked an attorney for a search and on the basis of the report he filed for a patent, only to learn after considerable expense that his application was not granted. He now has another invention but doesn't know what to do. What would we suggest?

It sometimes happens that the most diligent search will not disclose any conflicting patent. Then suddenly a patent in a seemingly unrelated field is allowed claims which cover the very things which you wanted to protect. The materials you use for the construction of your article generally cannot become part of the claims, nor would their use prevent you from patenting a new article made from them. We recommend that you try again. You may have better luck this time.

INVENTOR'S TIP OF THE MONTH

While some shears costing 39 cents perform as well as the more expensive types you still cannot buy a good pair at a reasonable price. Most shears seem to be made for people with large, calloused hands. After one season's use most shears bend the grass instead of cutting it. The same is true of pruning shears. The answer to this problem might possibly be found by applying the hydraulic press principle to shears. Or perhaps a mechanical or electrical substitute might be found. The price must be kept under \$5 to meet any success on the market. Production costs would have to be \$1 or less.

Emergency Railroad Truck

R. Riteine of Amherstburg, Ontario, Canada, sends descriptions and diagrams of an emergency device for use on railway cars with a burned off journal stub which could be put in motion in much less time than now is required. What should he do?

Your solution to this problem certainly seems to be based on solid lines. We are not convinced that you have eliminated the danger of a possible hunting or back and forth motion of the wheels and axle resulting when only one journal is operating. This could be prevented. If your system is adopted by railways you stand a good chance to benefit from its use. Otherwise you cannot do much with it. You will also need the services of engi-

[Continued on page 20]

INVENTORS

If you believe that you have an invention, you should find out how to protect it. The first step is to have a search made of the prior pertinent U. S. patents. If a report on this search indicates that the invention appears patentable you can apply for a patent, and the specifications and claims should be prepared.

The firm of McMorow, Berman & Davidson, with offices in Washington, D. C., is qualified to take the necessary steps for you. We can make a preliminary search on your invention, advise you whether we think it can be patented, and prepare your application for patent.

Unless you are fully familiar with the U. S. Patent Laws, we recommend that you engage the services of a Registered Patent Attorney to protect your interests. The patent laws are *your* laws. A patent gives you the right to prevent others from making, using or selling the invention claimed in your patent for a period of 17 years.

Use these patent laws for your protection. Investigate whether your invention can be patented. If you have what you believe to be an invention, we suggest that you have this firm make a search for you.

Send for a copy of our Patent Booklet entitled "How To Protect Your Invention," containing information about patent protection and patent procedure. Along with this we will also send you an "Invention Record" form, for your use in writing down and sketching details of your invention. We will mail them promptly. No obligation. They are yours for the asking.

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● Another Chance



While I enjoyed the Are You A Science Genius? quiz (June '57 MI) my wife enjoyed it more. We made a bet that the one who got the lowest score would have to do the dinner dishes every night for a month. I lost. Do you plan to publish another quiz? I'd like a chance to even things up around here.

Barry O'Keefe
Little Rock, Ark.

Hang in there, Barry. Another quiz is on the way. In the meantime, try rubber gloves.

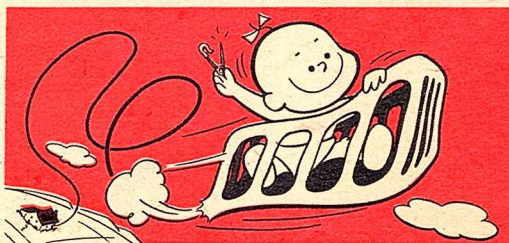
● Girl Gorilla

How did you ever get that picture of my mother-in-law, Moody Mokoko, in that excellent All About Gorillas story featured in the June '57 issue of MI. I thought I had seen the last of her.

Donald Dreary
Memphis, Tenn.

Wait'll she sees this, Don!

● Boooooooooooooom



About that inflatable playpen in your May '57 Inventions Wanted! What happens if baby grabs something sharp like a pin and sticks it into the playpen?

C. P. Hall
Akron, Ohio

Bye, bye, baby.

● Trunk Tester

Jim McMichael has the best and most relaxed technique for testing an auto trunk that I have ever seen. As a long-time admirer of his unique talents, I'd like to inquire about the possibility of taking up trunk-testing as my life's work. Do you know of any schools where you can get a diploma for this fine art?

Harry Kohler
Walla Walla, Wash.

Jim says trunk testers are born, not made.

● Flying Man

I am planning to build a one-man helicopter. I wonder if any MI readers could help me out?

Max Spears
Rte. 7, Box 100B
Austin, Texas

● MI Recipes



The tasty recipes cooked by Wynn Davis in Secrets of Successful Barbecuing (June '57 MI) left my taste buds quivering in joyous
[Continued on page 23]

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D. J. W., East Hartford, Conn.

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H. H. A., Winnipeg, Manitoba, Canada



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Invention Clinic

[Continued from page 16]

neers who will specify strength of materials and locking systems. We suggest that you take the preliminary steps of patent search. Then decide if this is something you would like to disclose to your company first—or take the risk of patenting it with the hope that you will be able to capitalize on the idea during the life of your patent grant.

Hang-Over Remedy

Earl Sullivan of Alturas, Calif., and his partner have obtained a patent on the composition of a tablet which will "cure" a hang-over. Several friends who have tried it claim it works. Yet the Federal Food & Drug Administration will not okay it because "their doctors are not convinced it will do what is claimed." What would we advise him to do?

As you gave none of the details of your patented product we cannot check the effectiveness of the ingredients. Medicine has advanced to such a degree that the effect on the human organism of certain chemicals is well established. It could be that the use of the word "relief" instead of "cure" would make the difference. We suggest that you discuss your problem with some physicians in the alcoholic wards of a local hospital. But we'll bet that the boys in FF&DA know what they are doing.

Push-Button Drawers

J. F. Sonney of Los Angeles, Calif., is associated with a man who has applied for a patent on a push-button device to open drawers. The principle can be applied to office or home furniture. What are the potentialities of this system?

There are hundreds of ways in which this

[Continued on page 22]

INVENTORS

I shall be pleased to furnish you, upon request, with information relative to patent procedure—without any obligation on your part.

PATRICK D. BEAVERS

Registered Patent Attorney

923 Columbian Building, Washington 1, D. C.



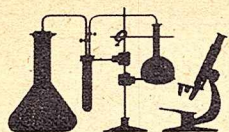
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SCIENCE SHORTIES

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Home accidents in America cause one death every 18 minutes.

Evidence indicates that smoking may increase blood supply to the eyes.

The common cold affects 25 per cent of all U. S. working adults in January and February alone.

About 38,000,000 acres in nine states are infested with the gypsy moth.

In the U. S. frozen vegetable consumption increased from one to 13 pounds per person between 1939 and 1955.

A French engineer launched a 34-foot, 16-ton yacht made of plastic.

A jet engine has completed the equivalent of more than 20 flights around the earth without overhaul.

One large egg furnishes about 80 calories.

The clothes moth grub is so small it can pass through a hole 1/25th of an inch in diameter.

Germany is now the world's third largest steel producer.

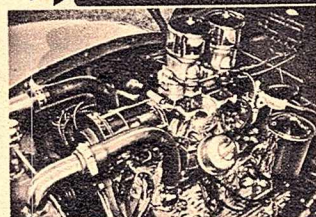
About 90 per cent of Bantu children were found in a recent study to be free of tooth decay.

An error in calculating spaceship orbit speed of one foot per second can produce an altitude change of some 750,000 feet.

Cabbage in Alaska produces heads up to 30 pounds in weight.

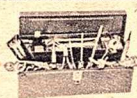
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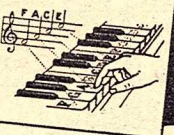
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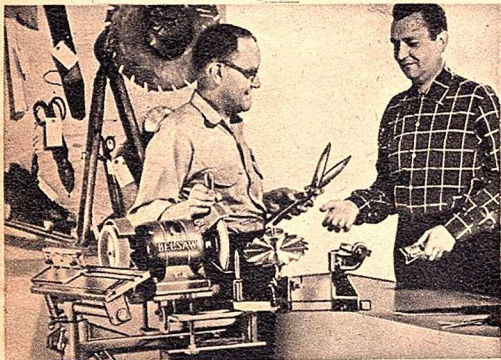
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Invention Clinic

[Continued from page 20]

result may be obtained. It would be necessary to know much more about the particular system on which a patent is being sought. You could use a motor drive, electromagnets, springs, weights, gravity and pneumatics and for each of these there are dozens or even hundreds of different modifications. We think that success here will depend more on the design and construction of the furniture than upon a push-button drawer arrangement.

Electronic Organ

Sherwood T. Gillette of Hicksville, N. Y., and V. J. Koutrny of Westmont, Ill., suggest similar ideas for an electronic organ with a group of cylinders with multiple tracks on each of which a single note of the organ would be impressed magnetically. Each track would have its own pickup. There would be a separate cylinder for each stop of the organ. A constant speed motor would rotate the cylinders. When any key is depressed the circuit to the corresponding pickup would be closed and fed into a power amplifier. What do we think?

To do this right you will need to match the wave forms so that they are continuous at the end of the revolution. You cannot stretch these, nor squeeze them together, although it has been done on a disc-type machine. Here a slight increase or decrease in the diameter of the sound track will permit perfect matching. However, a magnetic impression is not permanent. The system we mentioned used a photographic sound track, a light beam and a photocell to pick up the density changes and convert them into sound. The shutters were, extremely simple and minute, hence many could be packed into a small space. Frankly, your treatment is not good enough for today's market.

[Continued on page 25]

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Dear Editor

[Continued from page 18]

anticipation. Can't wait to get out the old grill and try 'em out.

Christopher Wenton
Detroit, Mich.

Watch out for the crowds, Chris!

● June Mystery Solved

Puzzle: Can you redesign a picture window so that it will be exactly half as big without altering its height or width?

Solution: Draw a diamond in the window so that each point touches the middle of the top, bottom and two sides of the window.

Bob Jones
Los Angeles, Calif.

Right. You can also cut it in half with a diagonal.

● August MI Mystery

A uniform eight-foot-long rod weighs 20 pounds and has weights of 15 and 25 pounds on its ends. At what point should one lift the rod so that it will balance?

M. Bezean
Kitchener, Ontario
Canada

● Dome Home

I was very much intrigued by the domes covering the homes in Here's Your House of Tomorrow (June '57 MI). However, I was discussing with a group of friends a way in which these domes could be cleaned. It seems to me that it would be a difficult job what with dirt, dust, etc. Do you have any solution in mind?

Vincent Spice
Great Neck, N. Y.

Suction-cup shoes and a bottle of Windex.

● Congrats

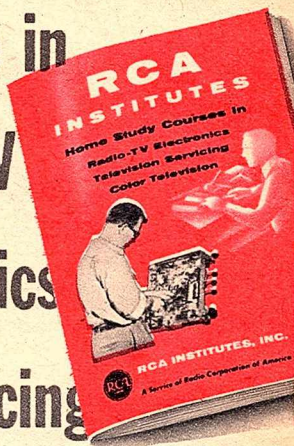
My sincere congratulations to J. G. Janes for his on-the-spot impressions of America's Top Sports Car Race (June '57 MI). As an avid sports car enthusiast, I'd like to thank Mr. Janes for his vivid and realistic sketches of the Sebring race in Florida.

Simon Tetzl
New York, N. Y.

You'll find another fine collection of sketches by Janes in this issue.

[Continued on page 24]

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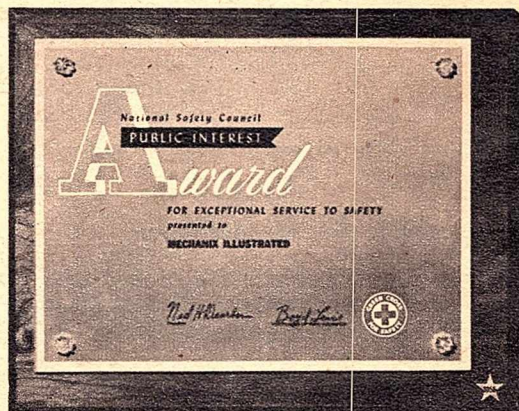
[Continued from page 23]

● Good Hearing

They Never Heard It So Good in the May '57 issue of MI was an effective picture story which we were especially pleased to see:

Margaret Rostel
Public Relations Director
American Hearing Society
Washington, D. C.

● MI Award



The plaque above was awarded to MI by the National Safety Council in recognition and honor of exceptional service to safety in the public information field. We are proud to accept it and will continue our vigorous efforts in the interest of national safety.

The Editors

● Coming Soon

Who won the \$5,000 offered by Victor Muscat for the captive-toothpaste tube? (Do You Want \$5,000? Feb. '57 MI.)

Charles Kerrson
Auburn, Maine

Mr. Muscat tells us that the search for a winning suggestion now is almost over and that he and his staff have chosen 2,500 of the best suggestions for final examination. In this they are to consult with the toothpaste companies with which his firm does business as to the feasibility and practicality of these designs. From the group one winner will be chosen, we are informed, and all other suggestions will be returned. Because of the great number of suggestions, Mr. Muscat says, it will be impossible to enclose a personal letter or appraisal with each one. He asks us to ex-

press his appreciation for the tremendous response to his offer (about 350,000 suggestions were received) and for the time devoted by you to the design for an improved toothpaste tube. We hope to publish the name of the winner as soon as Mr. Muscat makes his final selection.

● Out Of Towner

My brief letter in Mail For McCahill (Jan. '57 MI) caused me to receive six letters—from Texas, Washington, Indiana, New York and Manitoba and Prince Albert in Canada. Congratulations on your wide circulation. I would like to know who is the most far-away subscriber around the world to your magazine.

Keiichiro Hori
972 Naba Hamacho
Aioi-City, Hyogoken
Japan

Unless we have a reader in Siberia, KH, you're probably our most distant subscriber. Any challengers?

● Problem

I would like to find some simple method to fine-grind or shred newspaper. I have tried to use a commercial power grinder with wet paper but it brings out the water and forms a very hard-press wad on the feed screws. Is there a grinder made to do this job? If any of your readers can help me I would certainly appreciate it.

Lloyd Vyse
Box 191
Cass City, Mich.

Can anyone help Mr. Vyse with some good advice?

Invention Clinic

[Continued from page 22]

Flexible Foot Ladder

A. W. Fellows of Auburn, Calif., has designed a ladder which will adjust its own footing on hilly ground. Will we give him our opinion?

Your description is incomplete or you have ignored some of the more troublesome problems. Your lock permits the legs to be moved up or down but does not permit the angle of the base to be shifted, nor does it lock the ladder in place after the legs are firmly set. Furthermore, you seem to consider only a lateral shift. Hills slope in all directions. We recommend that you make a small model, test it and have the records searched. Then try to restyle the item so that it will fit any ladder. ●

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Picking The Pickup

*From stylus to cartridge to arm—
this is your hi-fi's triple play.*

By Donald Carl Hoefler

THE job of the pickup and its stylus—or “needle”—is to convert the side-to-side squiggles of record grooves to electronic signals. At present there are two popular methods of making this conversion, each based on an entirely different set of principles.

Most pickups will fall into one of two broad categories: *magnetic* or *piezoelectric*. The first electrical pickups were magnetic and were later supplanted almost entirely by the piezoelectric crystal. Then came General Electric's variable-reluctance magnetic cartridge (which helped start the current hi-fi boom) and magnetic cartridges once again held center stage.

Later the Sonotone Corporation discovered a way of producing a piezoelectric substance synthetically which enabled them to build a cartridge with much higher fidelity than any previous crystal. More recently there has been considerable activity in improving the

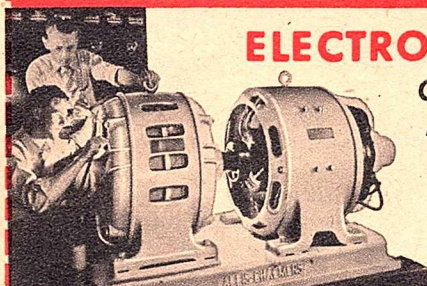
fidelity of natural crystals and these are once again making a strong showing in hi-fi competition.

The basic principle of the magnetic pickup is familiar to any high school physics student who has experimented with this phenomena. Move a simple bar magnet up and down in a coil of wire attached to a meter. The magnet is surrounded by invisible “lines of force” which are cut by the wires in the coil as the bar is moved causing the needle on the meter to react. This same principle is employed in power plants that develop commercial electricity and the magnetic phono pickup is in fact a miniature electric generator.

If the magnet is held stationary and the coil moved up and down, a similar voltage will be indicated on the meter. So we can generate a voltage whether we move the magnet near the coil or whether the coil moves relative to a stationary magnet. [Continued on page 28]

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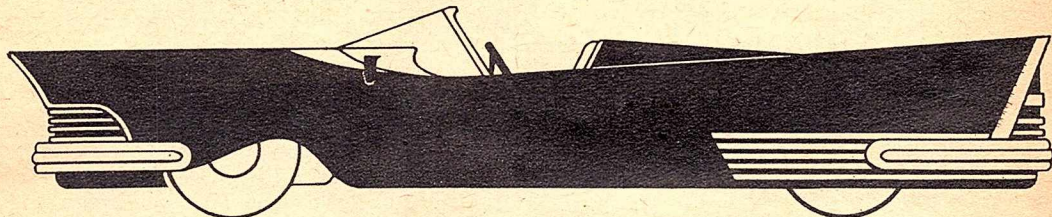
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Picking The Pickup

[Continued from page 26]

Magnetic Cartridges

Both of these systems are used in modern magnetic pickups. Typical of the moving-iron group—so-called even though the magnet material is actually Alnico or a similar alloy—are the G. E. variable-reluctance and the Audax. Most of the others, such as the Fairchild and the Electro-Sonic, are of the moving-coil variety.

Whichever system is used there must be some means of getting the stylus movement to the magnet or coil. In some cases the moving part is mounted right over the stylus itself; in others there are mechanical connections such as a metal shaft or bell crank. But since the whole system must move freely, generally the simpler the assembly the better. Poor lateral "compliance" will cause increased distortion and record wear.

The ideal pickup must also have good vertical compliance to track warped records and any "pinch" in the grooves. The more of this movement the stylus can absorb before the record has to lift the full weight of the pickup, the less wear there will be. At the same time this vertical stylus motion shouldn't result in any sound. This requirement is a tough one for reproducer designers, especially in the case of magnetic pickups.

As we noted last month, the output of a magnetic pickup is considerably below the other hi-fi sources, so it is customary to use a preamplifier to bring the phono signal up to usable value. Even if the preamplifier is a part of the main amplifier, it is used only with the magnetic cartridge.

Crystal and Ceramic Cartridges

The piezoelectric cartridges have considerably higher outputs and require no preamplifier. However, since magnetic pickups dominated the hi-fi field for so long at least one ceramic manufacturer includes an adapter with his cartridge to allow its conversion to those magnetic characteristics requiring a conventional preamplifier.

Piezoelectricity is found in some crystalline materials which, when bent or twisted, develop a voltage between their

opposite surfaces. When the movement of a phono stylus causes this twisting or bending a varying voltage is generated following the stylus movements in the groove.

The material used in crystal pickups is Rochelle salt and most of the cartridges made during the last decade were of this type. Still, this pickup had its limitations, particularly in frequency response. So when G. E. introduced the first low-priced magnetic cartridge with vastly superior characteristics it was very nearly curtains for the crystal.

A few years later Sonotone announced an entirely new piezoelectric cartridge made from a ceramic material that performed far better than the old crystals and had a few advantages over magnetic pickups as well. Ceramic material is not naturally piezoelectric, but it was found that applying a direct-current polarizing voltage to it during manufacture made it so.

Another advantage that ceramics offered over crystals was that they are not harmed by temperature or humidity. The advantages over magnetics include elimination of both preamplifier and equalizer and absence of magnetic interaction between the pickup and a steel turntable. The ceramic cartridge took the hi-fi hobby by storm a few seasons back and there are now several other manufacturers in the field besides Sonotone. These include Electro-Voice, Shure Brothers and As-tatic.

Sparked by the success of the ceramics, the crystal pickup is now enjoying a strong resurgence among audiophiles due to its greatly improved performance. There has been considerable activity in improving the Rochelle salt crystal cartridge in Europe—particularly in England and the Netherlands—and these improvements have appeared in this country in units such as the Ronette and the Recton-Golding.

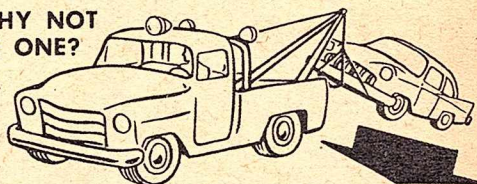
The Playback Stylus

Whichever type pickup is chosen, it will deliver top quality reproduction only if the stylus tracing the record grooves is of the correct size and shape. The materials most commonly used for styli today are osmium, sapphire and diamond, and all are

[Continued on page 31]

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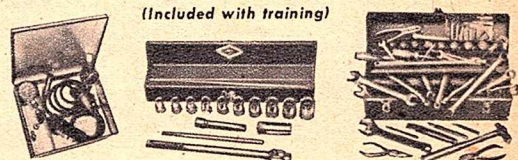


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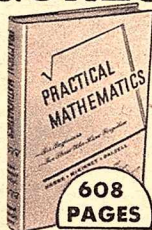
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Picking The Pickup

[Continued from page 29]

equally good—initially. Statements that hi-fi is possible only if one or another stylus material is used don't square with the facts. As long as the styli are made with equal care there is absolutely no difference in fidelity of performance.

Osmium is the cheapest and it also wears out sooner. Diamond is the most expensive, but it lasts the longest. Sapphire lies between them in both initial cost and in wearing qualities. There is absolutely no such thing as a "permanent needle," for even diamond points wear out eventually. But diamond is unquestionably the best buy in terms of playing hours per dollar.

It isn't possible to predict just how long any given stylus will last as this depends upon a number of variables. Record changers, for example, require considerably more stylus pressure than do the single-play turntables and thus they tend to shorten stylus life. Other factors of longevity include the phono cartridge, the arm structure, the record material and the care exercised by the operator.

Frequent inspection of a stylus' condition is strongly recommended. Sometimes the quality of reproduction may go down before the stylus actually damages the record. But more often the record is already harmed when the increased distortion is noticeable. Examination under a fairly powerful microscope will show up any flat spots on the tip, while a professional shadowgraphing by a stylus manufacturer is even more reliable. Both sapphire and diamond tips can be repolished to shape, but with osmium it just isn't worth it.

Today's commercial recordings offer three types of grooves. One of them, the transcription, is largely confined to broadcasting stations and wire-music services. The other two, though, are of definite interest to hi-fi fans. The so-called standard groove is employed in 78-rpm records while the microgroove is used for both LP and 45-rpm records.

These latter two groove types are quite different in size and somewhat different in shape and no "universal" stylus will track them both properly. In fact, the usual

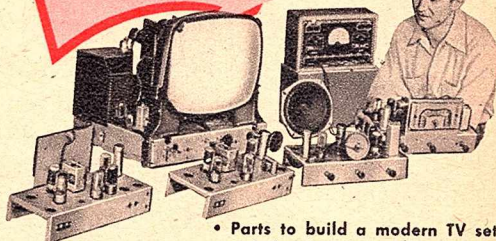
[Continued on page 35]

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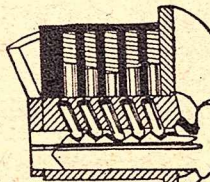
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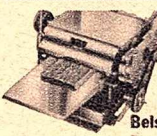
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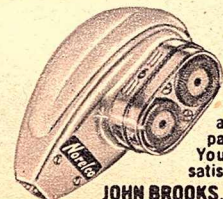
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PATENTS GRANTED

POTATO CHIP lovers will be happy to learn that Wilbur and Glenn McCollm of Long Island, Calif., have invented a dye to color chips orange, strawberry, lime green, lavender, violet and peach. They won patent number 2,789,056.

The great American taste treat—the hot dog—can now be cooked and delivered for eating in only 20 seconds on a new electric vending machine invented by Milton Rothstein, Arthur Rosoff and Seymour Yusem, who got patent number 2,790,379 for their efforts.

A pipe with a chin rest which is useful to men with few teeth or those of the false variety has been invented by Harry Berry, Baltimore, Md. Mr. Berry was granted patent number 2,790,452 for his creation.

Your wife's discarded nylon stockings and shirts may end up as part of your living room wallpaper with a chemical process invented by Folsom E. Drummond, Washington, D. C., and Malvern J. Hiler, Montgomery County, Ohio. Their process was given patent number 2,789,935.

Practical coffee bags, counterparts to tea bags, have been invented by Maurice Weisman of Newton, Mass., who received patent number 2,786,761.

Glowing rugs made of phosphorescent yarn is the invention of Harold E. Wadely, Irvington, N. Y. He got patent number 2,787,558 for his glowing yarn process.

Ultrasonics are now being used to "wash" auto windshields according to the invention of William E. McCown, Maumee, and James W. McAuley, Perrysburg, Ohio. The ultrasonic method won patent number 2,784,119.

John H. Gorby of La Mesa, Calif., has come up with a patent fall-out warning device which lets the nurse in the hospital know if her patient hits the deck. Device got patent number 2,784,395. •

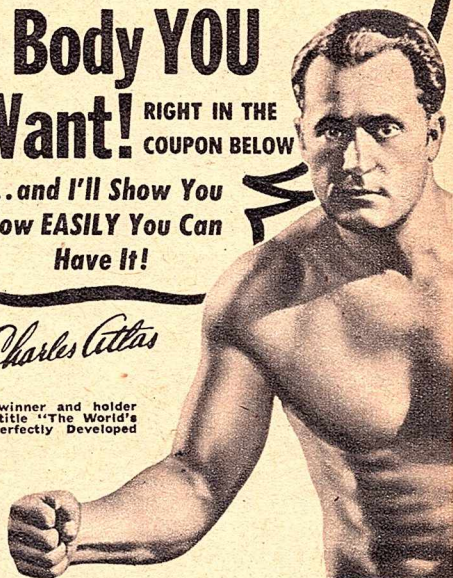
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Conquest of Space

By G. Harry Stine
Chief, Navy Range Operations,
White Sands Proving Grounds

BUILD SMALL, THINK BIG

IN the February '57 issue of MI this column was devoted to the principles of rocket safety. It touched off a deluge of mail. Letters came in from all over the country from boys and young men who wanted to build or were actually building their own rockets; they wanted to know more about safety principles, rocket construction and flight testing.

Unfortunately, it's almost impossible to write a reply giving "all the information on rockets and guided missiles." In fact, it's difficult to give any specific information on modern rocketry because it is very complex and/or classified. But because so many people have asked, I am going to do my best to give some specific information here that may aid amateur rocketmen.

To begin, I'm going to stress safety again because we want to have rocketry remain the world's safest business.

When most amateur rocket enthusiasts start to build a rocket they want to do one of two things: 1. Make their rocket big, about six feet long; 2. Start right off by trying to build a liquid propellant rocket. Obviously, the thing they are after is to break an altitude record! They think they need a big rocket to do it and they believe that solid propellants do not have the required energy.

Both of these ideas are wrong.

In the first place, beginning your rocket career by building a six-foot rocket is a good way to end it in a hurry. A big rocket means a lot of propellants, whether solid or liquid. This in turn means that a tremendous explosion is possible either in the enthusiast's shop or on the launcher. Big rockets also cost a lot of money; this means that amateurs must shoot their wad on one model. Often this one model runs into trouble with the result that the activities of the group or individual are curtailed until more money is obtained. If such a big rocket manages to get off the ground at all, there is an impact problem. A six-foot rocket falling out of the sky can do a lot of damage if it falls in the wrong spot.

It's much better to stick to a small rocket, not over 18 inches long and about an inch in diameter. It won't cost as much and you can build several of them. If something goes wrong there isn't as much danger involved. If you hope to build a real sky-buster, a small rocket will allow you to learn something about rockets as well as permit you to develop your design on an inexpensive scale before going whole-hog.

Regarding liquid propellants, the best advice I can possibly give is: *Don't.* Unless you are highly qualified by virtue of experience or professional training in rocketry, liquid propellants are nothing to fool around with. Very little information on liquid propellant rocket motors intelligible to the amateur is available; this requires the amateur to use cut-and-try methods which are dangerous. It places the enthusiast in the same position of the early rocket pioneers who were just learning 20 years ago.

Solid propellants are much simpler, cheaper and safer. And properly used, they can be as powerful as any liquid propellant rocket for amateur use. There are many books on solid propellant rockets available since these rockets are nothing more than modern skyrockets. Books on fireworks will give information on how to build skyrockets. Some of this information is not new but it is useful as background.

Ordinary black powder is a good propellant to start with. Composed of 75 per cent of the well known chemical potassium

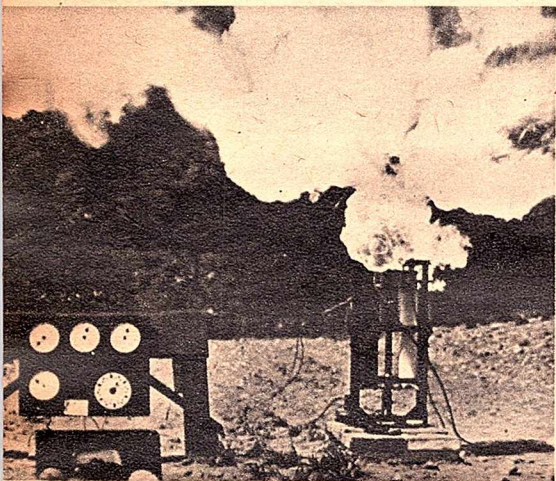


Photo courtesy G. Edward Pendray

LIQUID ROCKETS are dangerous for novices, says MI's expert. Use a solid propellant.

nitrate, 15 per cent charcoal and 10 per cent sulfur, it has plenty of strength for model rockets. Proper tools must be used to work with it, however. Steel or iron tools are taboo; brass or wooden tools which will not spark are required. You can tap black powder with a mallet and a brass rod all day long and nothing will happen because it is very insensitive to shock.

Using less than an ounce of black powder, it is possible to build a solid propellant rocket model which will go out of sight!

From here you can go on to larger rockets once you have learned how to handle the small ones. Furthermore you can do it with very little drain on your pocketbook.

To recap: Rockets are safer to work with than model airplane engines if you don't try to build a junior-sized ICBM. If you stick to solid propellant rockets, and small ones at that, you will gain experience and knowledge about rockets which will eventually allow you to progress to more advanced designs. Stick with solid propellants because they are tailor-made for amateur experimentation; liquid propellant rockets require a tremendous knowledge of the art as well as a complex assembly of highly reliable tanks, valves, piping, injectors, combustion chambers and the like—all of which do not come cheap.

When you can take a small solid rocket and fire it out of sight time after time without a failure, you will have learned a great deal about rockets, spent several fun-filled years and be ready to go on to bigger things. But until you can do this, help us keep rocketry safe by staying clear of the more advanced phases. You'll do yourself a favor, too! •

Picking The Pickup

[Continued from page 31]

compromise stylus will play *neither* type correctly. The hi-fi fan who wants to play all types of records must therefore have two separate styli.

The microgroove point has a tip radius of one thousandth of an inch, commonly called 1 mil, while the standard groove requires a 3-mil stylus. Most of the better cartridges mount both stylus sizes and incorporate a simple changing mechanism. Some purists, however, feel there's a little too much Rube Goldberg in such an arrangement and they prefer the separate plug-in cartridges, each with a single stylus firmly mounted.

Next month we'll tackle the big subject of recording characteristics and compensation. •

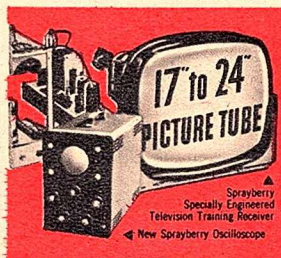
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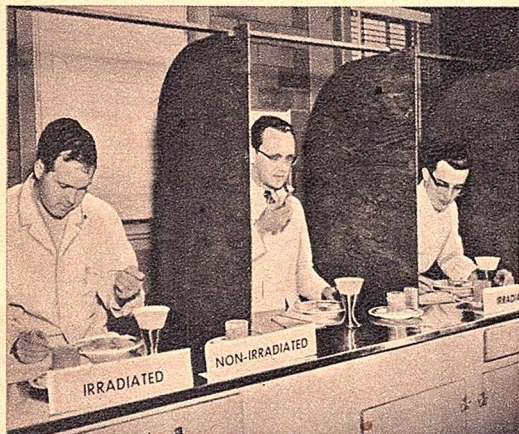


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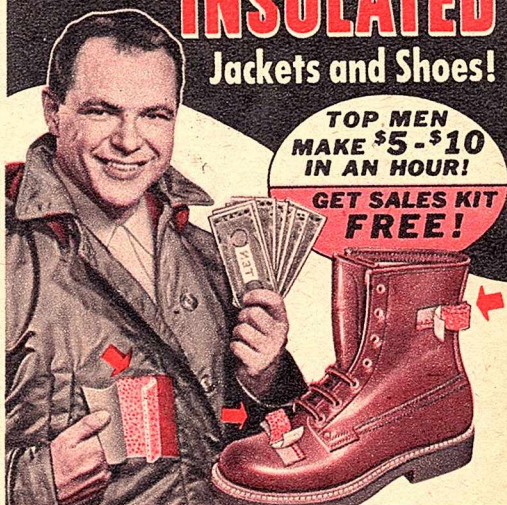
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YOUR OWN business—Suits \$1.50; Overcoats 65¢; Mackinaws 35¢; Shoes 12½¢; Ladies' Coats 30¢; Dresses 15¢. Enormous profits. Catalog Free. Nathan Portnoy Assoc., 605-M West 12th Place, Chicago 7, Ill.

PRINTING, ADVERTISING Salesmen—Excellent moneymaking sideline selling Decalcomania Name Plates, small quantities. Automobile initials, Sign Letters. Free Samples, "Ralco," XL, Boston 19, Mass.

MAKE GOOD Money In Spare Time without taking a job or putting in regular hours and without experience. \$50 to \$200 can be yours by showing Regal Christmas Cards to friends, neighbors, co-workers. So unusually beautiful they sell on sight. Write for Free Christmas card album and sample boxes on approval. Regal Greetings, Dept. 42, Ferndale, Mich.

SHINE SHOES without "polish." New invention. Lightning seller. Shoes gleam like mirror. Samples sent on trial. Kristee 67, Akron, Ohio.

SAVE MONEY! Buy Wholesale! Free catalog, general merchandise. Norris, 487-J Broadway, New York.

GADGETS, GIFTS, Gimmicks, Gags, Novelties. Wholesale catalog 10¢, free with 5 samples 25¢. Dohn-Marks, 2308CS South 9th, Maywood, Ill.

EASIEST \$65 YOU'LL Ever Make! Show amazing new "Magicolor" Christmas Cards. 65 boxes pay \$65. Personalized cards 40 for \$1.50. Assortments on approval, Free Sample Album. Sensational \$1.25 Gift Free for promptness. Southern, 478 N. Hollywood, Dept. 58-D, Memphis 12, Tenn.

SENSATIONAL PROFITS, no investment, dropship service, housewares catalog, details 25¢. Palmer Sales, Box 93, Lowellville, Ohio.

EASY HANDWORK makes fast-selling articles. Sample free. Sunmade Company, Brockton 64, Mass.

BUY WHOLESALE! Over 10,000 Nationally Advertised Products. Appliances, Cameras, Sporting Goods, Housewares, Watches, Typewriters, Tools, Clothing, etc. Send Postcard Today. Buy-Rite, Box 258, Hawthorne 22, N. J.

LARGEST WHOLESALE Supply Sources in U. S. Get 25 free catalogs. Furniture, clothing, appliances, auto accessories, farm equipment, tools, housewares, hobby supplies. For self or resale. Free details. Associated Wholesalers, 1016MX Starr, Burlington, Iowa.

NEED MONEY? \$50 yours. Sell only 100 boxes new Christmas cards. Other amazing offers. Free samples imprinted cards. Feature box assortments on approval; free catalog. 100 profitable items. Work with a national leader. Write today. Pen-N-Brush, Dept. M1-8, 139 Duane Street, New York City 13.

GOLD OR Silver Letters, Numbers. Windows, Doors, Trucks, 1" to 6". 500% Profits—Free Samples. Atlas-R, 544 West 79th, Chicago 20.

EVERY MAN a prospect. Request free sales kit showing line of belt buckles, individualized with customer's name and emblems, also cap badges for trucking, bus, taxi, police, firemen. Choice 3000 emblems. Hook-Fast, Box 1425M1, Providence, R. I.

\$1,000.00 A MONTH for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P-55Z, New York 16.

NEW BATHROOM Deodorizer. Hangs on wall. Banishes odors bathroom, kitchen. Lightning seller. Samples sent on trial. Kristee 66, Akron, Ohio.

FREE "\$5,000-\$45,000; UNLIMITED Vacations." Work home! No merchandise, equipment! Haylings-MI, Carlsbad, Calif.

FREE! BEAUTIFUL Feather Pictures 200% Profit! Apartado 9036, Mexico 1, D. F.

MAKE \$50-\$75-\$100 AGAIN and again. Show friends New Idea Christmas, All Occasion boxed assortments, gift wrappings. Profits to \$1.00 per box. Write for Feature boxes on approval, 64 Free Personal Christmas Card, Stationery samples, Free Catalog, Sensational Free Offer. New England Art Publishers, North Abington M-86, Mass.

FREE LISTS 640,000 items Wholesale. Cottage Industries, Box 6011-M, Chicago 80.

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AD MATCHES! Sell amazing designs—10, 20, 30, 40 and 240-light book matches. Bigger spot cash commissions; every business a prospect. Low prices for high quality. Repeats. Start without experience; men, women; full, part time. Buy nothing! Sales kit furnished. Match Corp., Dept. M1-76, Chicago 32, Ill.

EXCLUSIVE LINE of personal initialed buckles, belts, cap badges, 3,000 emblems, uniforms, shirts, caps, etc. Hook-Fast, Dept. M1, Roanoke, Va.

ANYONE CAN Sell famous Hoover Uniforms for beauty shops, waitresses, nurses, doctors, others. All popular miracle fabrics—nylon, dacron, orlon. Exclusive styles, top quality. Big cash income now, real future. Equipment free. Hoover, Dept. H-102, New York 11, N. Y.

MAKE EXTRA Money. Cash commissions. Everybody buys easy-to-sell Advertising Book Matches. Union label. Big variety—Glamour Girls, Scenics, Hillbillies. Powerhouse selling kit free. Steady repeat business. No experience necessary. Superior Match Co., Dept. F-857, 7528 S. Greenwood, Chicago 19.

IF YOU'RE interested in making money in selling, see the hundreds of exceptional opportunities in Salesmen's Opportunity Magazine. Send name for your copy, absolutely free. Tell us what you're selling now. Opportunity, 848 N. Dearborn, Dept. 19, Chicago 10, Ill.

WILL YOU wear new suits and topcoats without one penny cost and agree to show them to friends? You can make up to \$30.00 in a day even in spare time, without canvassing. Progress Tailoring Co., 500 South Throop St., Dept. L-326, Chicago 7, Ill.

\$1,000.00 A MONTH for making dramatic 3-second demonstration of amazing lightweight Presto Fire Extinguisher. New chemical used by Airforce snuffs out fires instantly. Only \$4.95. Terrific commissions. Millions want it. Free Kit. Merlite, 114 E. 32nd, Dept. P-55Z, New York 16.

GOLDMINE of 600 money makers. Copy free. Specialty Salesman Magazine, Desk 7-B, 307 N. Michigan, Chicago 1.

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WANTED: HOME producers, to be sub-contractors. Cast plastic products for manufacturers in our Clearing House Service. Thousands of easily-made items required. Cash in at home, without previous experience. Plastic Service Associates, Dept. 8-MI, East Boston 28, Mass.

YOUR OWN name brand business. No investment; no inventory. Part time or full time. Sell famous brands of appliances, housewares, silverware, radios, vacuum cleaners, lamps, tools, clocks, watches, jewelry, etc., over 1,000 items. Join thousands of successful independent dealers. Send for Free catalog and dealer price list. H. B. Davis Corp., Dept. 16, 145 W. 15 St., New York City.

\$70 WEEKLY—HOME, spare time. Simplified mail bookkeeping. Immediate income—easy! Auditax, 34757E, Los Angeles 34.

LEARN APPLIANCE Service and Repair. Motors, Washers, Refrigeration, Cleaners, everything. Free Booklet. Armstrong, 11027-C South Vermont, Los Angeles 44.

BUY NATIONALLY Advertised Merchandise Direct. For self or resale. 25 free catalogs. Also new products, tested mail sellers. Free details. Associated Wholesalers, 1016-M Starr, Burlington, Iowa.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard-brings details. American Buyers, Hertel Station, Buffalo 16-YI, N. Y.

NEWEST SPARE, Full-Time Business. \$5 to \$10 hour possible. Paint with Suede—the finish with touch and eye-appeal. Beautiful auto dashboards, signs, radios, toys, figurines, lamps—1,001 others. Complete, Step-By-Step Instructions sent for no-risk examination. Free details. Coast, Dept. AT, Los Angeles 61.

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PRINT FOR Profit At Home. Amazing new method prints colorful posters, banners, greeting cards, glassware—anything. Hundreds at time. No press needed. No art. Fantastic profits! Need representative your area immediately! Free home-business plan. Screen Print, Dept. AT, Los Angeles 61, Calif.

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GROW ORCHIDS at home—profitable—fascinating. Year 'round, Maine to California. No Greenhouse. Successful home grower shows you how to provide proper temperature and air conditions in any well lighted room. Full details & real Orchid Seeds Free. Orchidland, 100 So. Vermont, Los Angeles 4.

YOUR ENVELOPES addressed accurately, reasonably. Fast service. We have capable addressers in your city. Glenway System, Box 6568, Cleveland 1, Ohio.

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MAKE MONEY Growing Miniature Trees on your Window Sill. Free Seed and Plan. Miniature Nurseries, Dept. AT, Gardena, Calif.

START YOUR own subscription service. Every family buys magazines. No capital needed. We tell you how, furnish all supplies Free. Liberal commissions. Write McGregor Magazine Agency, Dept. 150, Mount Morris, Ill.

HOME-IMPORT MAIL Order Business—Import profitable items below wholesale. Experience and product investment unnecessary. Full, spare time. Famous world trader guides you. Free list "157 imports," details. Mellinger, G758, Los Angeles 24.

11,000 NEW PROSPECTS Daily. Baby record books, shoes, albums. Sell mail-order. Use our literature. Write: No-Co-Ro, Capitola 16, Calif.

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VENDING MACHINES—No selling. Operate a route of coin machines and earn amazing profits. 32-page catalog Free! Parkway Machine Corporation, Dept. 2, 715 Ensor St., Baltimore 2, Md.

BREED RARE Tropical Fish At Home. Earn Big Money! Learn Secrets! Help fill huge demand. Amazing Opportunity! Free Plan. Tropicals, Los Angeles 61, Calif.

FIX TYPEWRITERS. Inexpensive home course teaches Factory Secrets. Free Booklet. Write, Typewriter, Tarentum 3, Penna.

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OPPORTUNITY To earn \$15,000-\$30,000 annually. Franchise protected. Granted on \$12,500 basis. Live at home. No merchandise to buy. Selfemployed. One of most exclusive and noncompetitive Businesses in United States and Canada. Send for free explanatory booklet. Harrell & Company, Box 8-F, Louisville, Ill.

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COLORGLAZED CONCRETE pottery made without molds. Patented method. Cemetery products, novelties, tiles. Basement leaksealing. Money-making projects. Booklets, details free. Men only. National Pottery, Grand Rapids, Minnesota.

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"THEY HAND Him \$100!" Free Packet "Secret Journal." 919 Secrets—Plans! Work home. Publico-JJ, Oceanside, Calif.

BUY WHOLESALE! Over 10,000 Nationally Advertised Products. Appliances, Cameras, Sporting Goods, Housewares, Watches, Typewriters, Tools, Clothing, etc. Send Postcard today. Buy-Rite, Box 258, Hawthorne 23, N. J.

OPERATE EASY-TO-START, profitable home Mailorder Business! A. Mann, Woodcliff Lake, N. J.

FREE FOLDER: "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-45, Cedar Hill, Texas.

BRICKLAYERS BUY tools at wholesale, sell retail. Standard discounts. Details. Horseheads Supply Co., Horseheads, N. Y.

CHICAGO AND Indiana job opportunities. Classified ads. Questions answered. John Murzyn, 1625 Central Ave., Whiting, Ind.

WANT TO Make Big Money At Home? \$10.00 profit in an hour possible with Invisible Reweaving. Make tears, holes disappear from clothing, fabrics. Steady year-round demand from cleaners, laundries, homes. Details Free. Fabricon, 8323-S Prairie, Chicago 19, Ill.

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MAKE \$25-\$50 WEEK, clipping newspaper items for publishers. Some clippings worth \$5.00 each. Particulars free. National, 81-X, Knickerbocker Station, New York.

OPERATE YOUR own mail order discount business at home spare time. Sell gifts, appliances, housewares, cookware, cutlery, dinnerware, silverware, jewelry, watches, etc., at discounts to 75%! No stock investment. We ship your orders under your name. Catalogs, sales letters, order blanks, envelopes printed with your name can cost you nothing. Postcard brings free sample catalog, all details. Topval Corp., Lindenhurst 929, N. Y.

COSTS 8¢—RETAILS \$1.00. Automotive product. You manufacture, distribute. Easy! Wilson, Box 505-I, Princeton, W. Va.

FREE PLAN—Entirely Mailorder—New Different. Everything Furnished. Huge Profits Possible. Eastern, Box 142-M, Boston 24, Mass.

JUST PUBLISHED. The "Idea" guide, by author of "Strike It Rich"; gives spanking new money making ideas, tips, plans, etc., never before revealed; also, gives amazing "Method" that makes all fortunes. Free literature. Write: Home Industries, 1430 W. Monroe Street, Chicago 7, Ill.

RUBBER MOLDS: Make own. Big Money. Free information . . . Sample. Write: **Bing Products, Lynn, Mass.**

BOOK "505 ODD, Successful Businesses" free. Work home! Pacific-23C, Oceanside, Calif.

MAKE \$46 FROM Square Foot Plywood; Jigsaw necessary. Free Information. Woodarts, X-57, Bridgewater, Mass.

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IF YOU want to earn money fast, I'll send you Free Sample Stocking of newest Stretch DuPont Nylons to sell at only \$1 a pair. American Mills, Dept. 620, Indianapolis 7, Ind.

EARN HIGH Pay: Jobs in South America, the Islands, USA, Europe, Canada, other foreign countries. All Trades, Mechanics, Truck Drivers, Laborers, Office Workers, Engineers, etc. Chance to travel. Fare paid if hired. Application forms. Free information. Write Dept. 109, National Employment Information, 1020 Broad, Newark, N. J.

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JOBS ON Ships! Experience unnecessary. Transoceanic, Box 494, Baltimore 3, Md.

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MEN-WOMEN! START Money-Making Plastic Laminating Business at home in spare time. Material that costs 11¢ brings back \$2.58. No canvassing or selling but mail orders bring in \$20 a day. Write for full particulars Free. Rush name on postcard to Warner, Room CL-4-J, 1512 Jarvis, Chicago 26, Ill.

HOTTEST MAIL Order Plan Ever! Sell Photos, Films, Art Novelties. Huge Proven Profits! Free Details! AMPRO, Dept. 3, 429 South Western Avenue, Los Angeles 5, Calif.

FREE "\$5,000-\$45,000; UNLIMITED Vacations." Work home—sparetime. No merchandise, equipment! 100 other home-work businesses! Haylings-MI, Carlsbad, Calif.

START A Buying Service, buy wholesale thousands nationally advertised products. Make big profits selling at sizeable discounts. Postcard brings details. American Buyers, Hertel Station, Buffalo 16-ZI, N. Y.

MAKE TOP money collecting Snakes, Lizards, Turtles, Toads, Frogs. We pay guaranteed prices. Details 25¢. Biological Exchange, Dept. 16d, Box 5302, El Paso, Texas.

SELL TITANIA Gems; far more brilliant than diamonds. Catalog 10¢. Diamondite, 2420-X 77th, Oakland 5, Calif.

"50 NEW HOME-BUSINESS Ideas" booklet Free. Coast Industries, M8C, Los Angeles 61.

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MEN AND Women Wanted to start home business in spare time with little table-top rubber stamp machine. Easy to earn up to \$9.80 an hour without previous experience. Full particulars Free by mail. Send postcard to Roberts, 1512 Jarvis, Room CR-4-J, Chicago 26, Ill.

60% PROFIT ON Cosmetics—famous nationally advertised Hollywood cosmetics pay 60%. Make \$25.00 day up! Hire others. For free samples, details, write Studio Girl, Glendale, Calif., Dept. 2078G.

MAKE EXTRA Money. Cash commissions. Everybody buys easy-to-sell Advertising Book Matches. Union label. Big variety—Glamour Girls, Scenics, Hillbillies. Powerhouse selling kit Free. Steady repeat business. No experience necessary. Superior Match Co., Dept. FX-857, 7528 S. Greenwood, Chicago 19.

START BIG-PAY Business At Home in spare time. No experience needed to operate little table-top machine for bronzing baby shoes. Make \$5.46 profit on every pair. Full particulars Free. Send postcard to Mason, 1512 Jarvis, Room CM-4-J, Chicago 26, Ill.

TOP PRICES Paid, cutting wanted items from your newspapers. Revealing Instruction, 10¢! Economy, Box 768, Largo 4, Fla.

WANT EXTRA Cash? Send your name for money-making Christmas Card and Gift samples. Showing them to friends pays you as much as 50¢ to \$1.25 profit per item—\$150.00 easy! Samples on approval. \$1.25 Gift offered Free! Midwest, 1113 Washington, Dept. 475-J, St. Louis 1, Mo.

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WE PAY \$3.50 lb. Grow Mushrooms. Celar, shed and outdoors. Spare, full time, year round. We have over 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 184, 2954 Admiral Way, Seattle, Wash.

"THEY HAND Him \$100!" Free Packet "Secret Journal." 919 Secrets—Plans! Work home. Publico-JJ, Oceanside, Calif.

\$200. MONTHLY REPORTED, addressing envelopes. Revealing method, 25¢! Economy, Box 768, Largo 3, Fla.

\$300. MONTHLY POSSIBLE mailing circulars. John Hall, 1265-C Broadway, New York 1, N. Y.

MAKE MONEY clipping newspaper items for publishers. Newskraft, MI-983-E, Main, Columbus 5, Ohio.

MAKE \$25-\$50 WEEK, clipping newspaper items for publishers. Some clippings worth \$5.00 each. Particulars free. National, 81-X, Knickerbocker Station, New York.

BUY WHOLESALE! 20 names, addresses with wholesale catalogs. Send only \$1.00. Box 25744, Los Angeles 25, Calif. **BUSINESS** OF your own. Earning potential as high as \$40,000 annually. Issued on \$12,500 base. No merchandise to buy. Send for free explanatory booklet. Harrell & Company, Box 8-FF, Louisville, Ill.

FREE WHOLESALE catalog. Gifts, appliances, housewares, cookware, cutlery, watches, dinnerware, silverware, jewelry, etc., discounts to 80%. Topval Corp., Lindenhurst 530, N. Y.

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60% PROFIT ON Cosmetics—famous nationally advertised Hollywood cosmetics pay 60%. Make \$25.00 day up! Hire others. For free samples, details, write Studio Girl, Glendale, Calif., Dept. 5078G.

\$250.00 WEEK SPARE time profit possible. Earn at home with new fascinating Printing method. \$5 starts you—send no money now. Free Confidential Facts and Valuable Samples. Screen-Print, 38C, Los Angeles 61.

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WE PAY \$3.50 lb. Grow Mushrooms. Celar, shed and outdoors. Spare, full time, year round. We have over 25,000 customers. Free Book. Washington Mushroom Ind., Dept. 102, 2954 Admiral Way, Seattle, Wash.

FREE FOLDER: "How to Make \$3,000 Yearly, Sparetime, Backyard, Raising Earthworms!" Oakhaven-3, Cedar Hill, Texas.

Classified Advertisements

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ELECTRIC GUITARS, amplifiers, wholesale, free catalog. Carvin MIW, Covina, Calif.

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EXPERIMENTERS: TERRIFIC Bargains Galore! Supplies Catalog 25¢. Hagenow Laboratories, 2414 Clark, Manitowoc, Wisc.

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LATEST—BEST Formulas. Genuine Money-makers. Free literature. Kemistry, Park Ridge 40, Ill.

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REAL MANUFACTURING Formulas. Lists free. W. Cummings, 228 Gordon, Syracuse 4, N. Y.

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FREE—BIG New Wholesale Catalog! Up to 50% saving for you, family, friends on nationally-known gifts, jewelry, toys, appliances, Christmas cards, etc. Also make money selling part time! Write: Evergreen Studios, Box 846-P, Chicago 42, Ill.

60% PROFIT ON Cosmetics—famous nationally advertised Hollywood cosmetics pay 60%. Make \$25.00 day up! Hire others. For free samples, details, write Studio Girl, Glendale, Calif., Dept. 5078G.

MAKE \$25 TO \$35 weekly addressing envelopes. Our instructions reveal how. Glenway, Box 6568, Cleveland 1, Ohio.

STAMPED LINENS For Embroidery Or Painting. Buy direct from manufacturer and save. Send for Free catalog. Merribee, 16 West 19th St., Dept. 429, New York 11, N. Y.

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THEY'RE FINDING Millions! Confidential bulletins report current expeditions, jobs facts, finds. Details: where and how to look. Regularly \$12 year; trial subscription plus map, \$1.00. "Treasure Hunter's Guide," Box 598-A, Miami 34, Fla.

FIND LOST or hidden treasure with new, improved metal detector. Works around salt water. No ground pick-up. Free literature. Gardiner Electronics, Dept. 3, 2545 E. Indian School, Phoenix, Ariz.

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FREE PRINTING price list. John Peper, Box 822, Chattanooga 1, Tenn.

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DO YOUR Own Printing. Save money. Simple rules. We supply everything. Print for others; good profit. Raised printing like engraving, too. Have home shop. Details free. Kelsey Presses, V-57, Meriden, Conn.

MAKE YOUR Own self-molding rubber stamps and printing cuts. Plexirubber, Argyle 3, Wisc.

• • • STAMP COLLECTING

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"WOW! 135 ALL Different Germany 10¢." Big collection includes old Zeppelins, Semi-Postals, Airmails, High Values, Giant and Midget-sized Stamps. Extra! Complete bargain catalog, free booklet. Approvals. Jamestown Stamp Co., Dept. A8MIC, Jamestown, N. Y.

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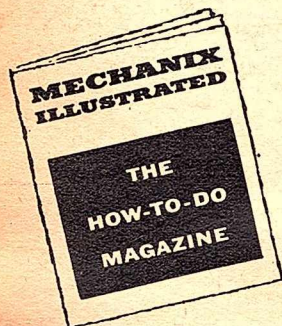
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Albert Constantine and Son, Inc., 2050 Easchester Rd., N. Y. 61, dealers in rare woods, veneers, hardware, tools and finishing materials, have introduced a new catalog, "Constantine's Manual for Craftsmen." Priced at fifty cents, it contains information about woodworking, veneering, inlaying, finishing and other popular craftwork.

Need guidance in building a kitchen into a new home or remodeling an existing

one? You can get a free copy of a 32-page "Kitchen Planning Book" by addressing United States Steel, P. O. Box 86, Pittsburgh, Pa.

The complete line of South Bend precision machine tools is illustrated and priced in their new 80-page catalog, No. 5700. To get your free copy, write South Bend Lathe Works, South Bend 22, Ind.

A new home course in ceramic tile setting is available at low cost to those who want to learn this trade. For more information, write to The American Institute of Tile Setting, P. O. Box 153, Los Gatos, Calif.

Three new booklets on how to buy, work and finish fir plywood have just been released. Single copies are available free; quantity prices are \$1.75 per 100 for "How to Finish Fir Plywood" and "How to Buy Fir Plywood" and \$3.50 per 100 for "How to Work Fir Plywood." Send requests to Douglas Fir Plywood Association, Tacoma 2, Wash.

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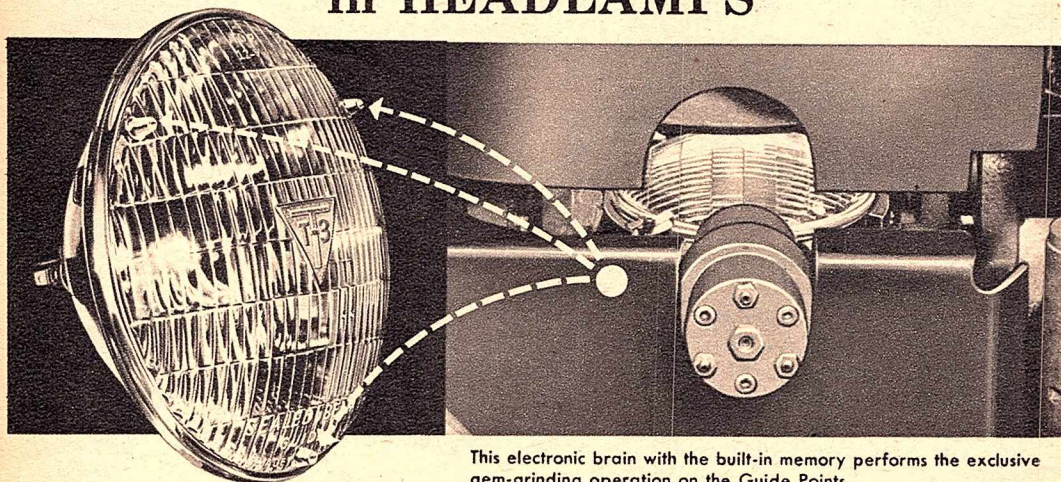
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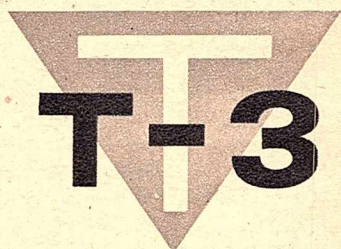
Accuracy to 1/10,000th of an inch insures precise calibration between aiming plane and filament of each headlamp.

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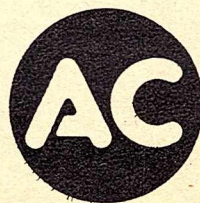
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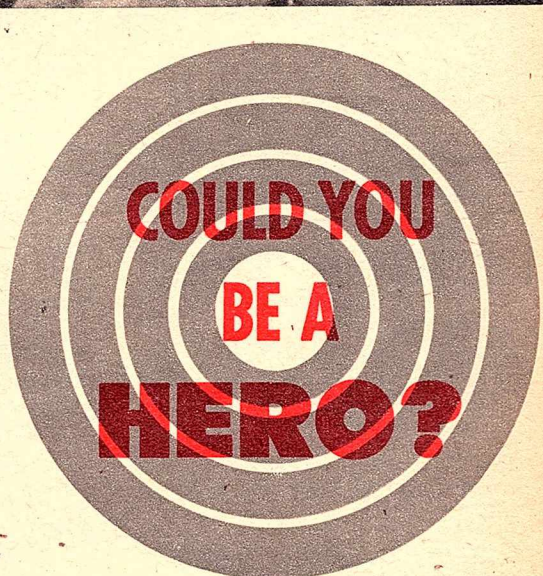


THE ELECTRONICS DIVISION OF GENERAL MOTORS



INFANTRYMEN in Korean War were tested to discover what gives a soldier courage.

*Your reactions in the face of
danger are based on personality
traits you may not even be aware of!*



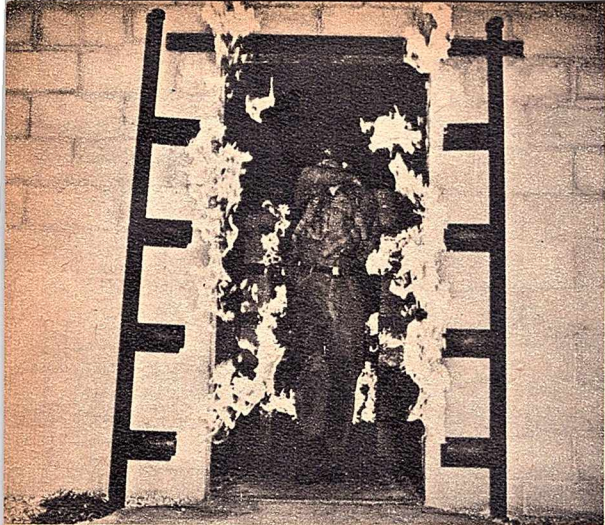
By Harry Kursh

(Editor's Note: Before reading this article we suggest you turn to page 55 and take the Courage Quotient Test to rate your own potential for being a hero when confronted by danger.)

ONE foggy morning last November, 57-year-old Jonathan Kruger stopped to chat with his daughter on a street in North Bergen, N. J. Suddenly, he looked up. He heard the sound of a

plane flying too low. Then he saw it. The plane was headed straight for a tall radio tower. In a flash it was a fiery mass bouncing off the tower into the side of an apartment house.

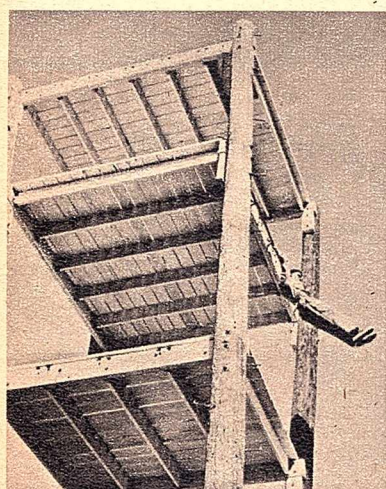
Kruger's heart pounded as he saw thick black smoke and flames engulfing the house. What was a middle-aged man to do? He mumbled a quick prayer, told his daughter not to follow him, then dashed into the burning



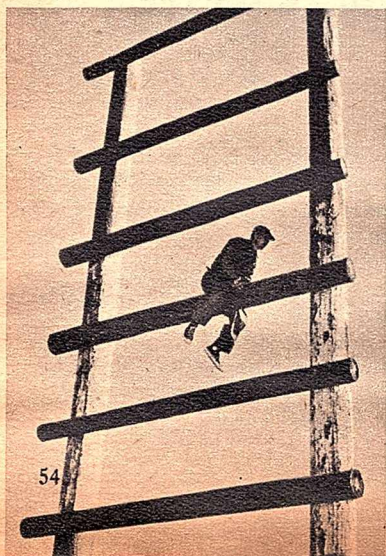
AT LACKLAND Air Force Base in Texas, trainees are taught to overcome a natural



fear of fire (top left) and great height. Jumper safely slides down overhead line.



TRAINEE swings out over space in test simulating air emergency.



house. He raced up to the top floor where he heard the cries of two children behind a locked door. Desperately Kruger battered the door until it gave, grabbed the two children and brought them down to safety. Without hesitation he went right back into the smoke-choked halls and found an old lady lying on the floor. He tried to lift her but couldn't. His own strength rapidly waning, he grabbed her by the arms and dragged her until he passed out.

Luckily Kruger was rescued and revived. Next day he was asked: "Why did you do it—a man of your age? Why didn't you wait for the police and firemen to arrive?"

"Under similar circumstances," Kruger replied modestly, "any man would do the same thing. Maybe you think you're not a hero but when the chips are down you can be the bravest man in the world."

What do you say? Is Kruger right? Would you have done the same thing? If you don't have a ready answer, don't let it bother you. Unless you have a chance to test your courage you may never know. But you're not worried, of course—"when the chips are down," you, too, can be a hero. Isn't that the idea we all have?

Unfortunately, it doesn't always stack up that way. Consider, for instance, the time two Kansas well-diggers were trapped by a sudden cave-in. The experts at the scene said there was only one way the men could be brought up alive. Someone had to go down into the hole and dig with his bare hands; otherwise there might be another cave-in. Even then there was only a 50-50 chance of the rescuer and the men getting out alive.

The trapped men were all but given up for lost

ALL TESTS are voluntary—each is designed to give men confidence.

when a school janitor in his 50s volunteered to attempt the rescue. He crawled down the hole and dug by hand for hours, finally saving the two men with only seconds to spare before the well caved in again.

Why was the school janitor the only brave man around? Do some

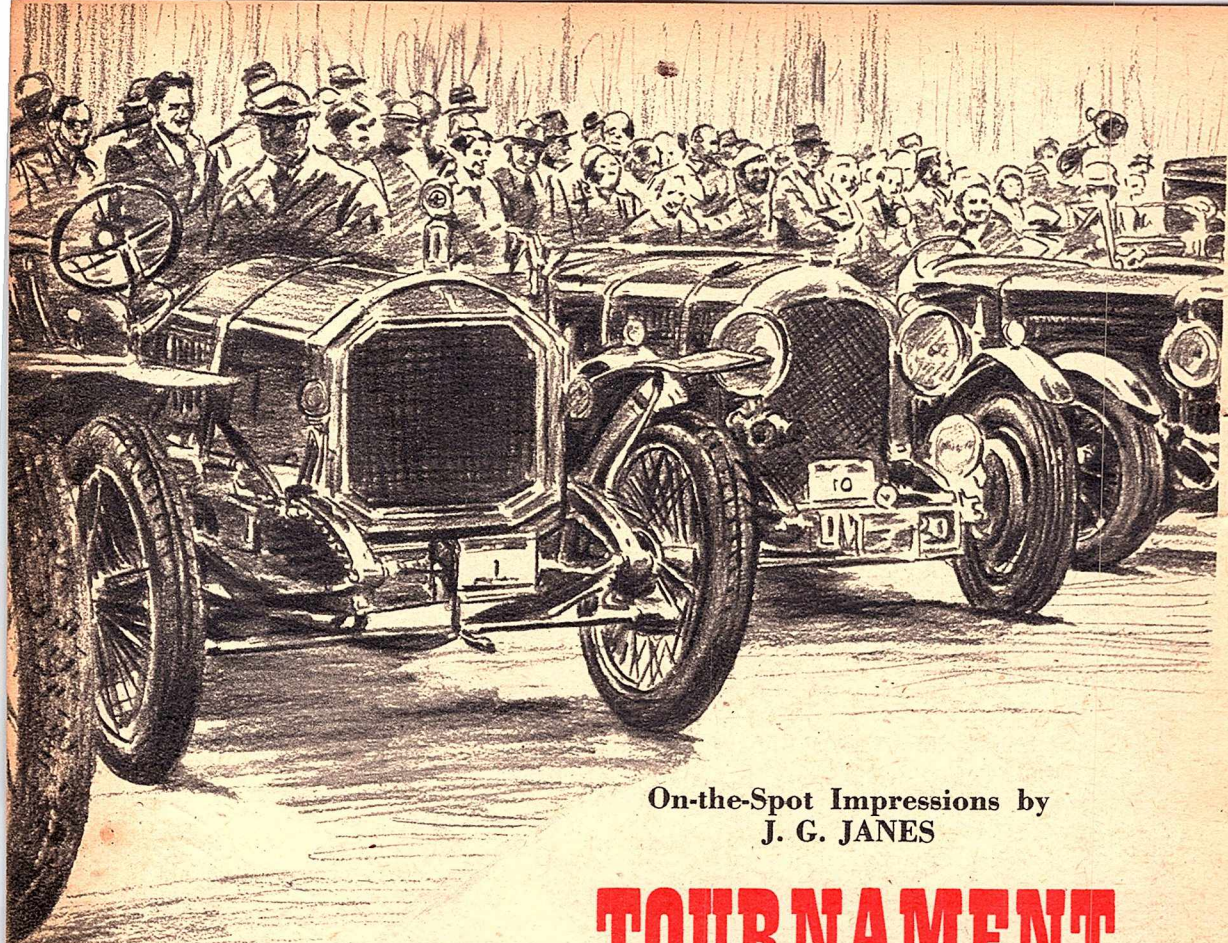
of us have built-in yellow streaks?

In my search for the answers I spent weeks pouring over a number of scientific reports and studies of known heroes. I talked with scores of experts in every related field, from the armed forces to police chiefs and psychologists. No two [Continued on page 186]

TEST YOUR COURAGE QUOTIENT

Here is a sample of a test psychologists use to help determine your potential for being brave when faced with danger. Check whether you agree or disagree with each of the following statements. Answer each the way you really feel, not the way you think you should feel. After completing the test, see the scoreboard at the end of this article for your total number of points and your Courage Quotient.

	Agree	Disagree
1. Any man should love camping and hunting.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
2. Only a sucker goes out of his way to help people.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3. It's more exciting to be a bank clerk than a lumberjack. . .	<input type="checkbox"/>	<input checked="" type="checkbox"/>
4. Practical jokes are fun.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. I would like to be a skillful mountain climber.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
6. I wouldn't like a job with irregular hours.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
7. A man should get tough when people pick on him.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
8. A man who is good at making outdoor fires should be admired	<input type="checkbox"/>	<input checked="" type="checkbox"/>
9. Bad weather always annoys me.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
10. Most people are essentially selfish.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
11. A man should be loyal to his friends, whether they are right or wrong	<input type="checkbox"/>	<input checked="" type="checkbox"/>
12. Nobody should work hard if he can get away with it.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
13. A totalitarian system of government is more efficient. . . .	<input type="checkbox"/>	<input checked="" type="checkbox"/>
14. Always follow the rules if you want to get places.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
15. A boy who likes pets grows up to be a better man.	<input type="checkbox"/>	<input checked="" type="checkbox"/>
16. A cowboy movie is more interesting than a good love story	<input checked="" type="checkbox"/>	<input type="checkbox"/>
17. A man who spends his money too freely is a fool.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
18. A man who seldom boasts should be admired.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
19. I would get enjoyment from any job if I did it well.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
20. Desk work is more for a woman than a man.	<input checked="" type="checkbox"/>	<input type="checkbox"/>
21. I'd rather read a detective story than a humorous story. . .	<input type="checkbox"/>	<input checked="" type="checkbox"/>
22. A foreigner can't think or act as fast as an American. . . .	<input type="checkbox"/>	<input checked="" type="checkbox"/>
23. After most wars, the U. S. came out the loser in the peace treaties	<input type="checkbox"/>	<input checked="" type="checkbox"/>
24. A man without close friends would be lonely.	<input checked="" type="checkbox"/>	<input type="checkbox"/>



On-the-Spot Impressions by
J. G. JANES

*British and American clubs
pilot their ancient wagons
through a five-state rally.*

TOURNAMENT OF OLDSTERS

CYRIL RITCHARD, English actor famous as Captain Hook, announced rally results. Below, he chats with Bob Kilborne, driver of 1913 Pierce Arrow.



THE Vintage Sports Car Club of Britain recently sent over a team of 11 intrepid drivers and their beautifully restored antique and classic sports cars to do battle with an equal team put together by the Veteran Car Club of America.

In 1954 our British cousins had drubbed us in a similar affair on their home grounds and we were out to even the score. This we did—but not easily.

The rally, co-sponsored by Esso and the Veteran Car Club, started from Rockefeller Plaza in New York on April 23. It ran for eight days through five estates and covered 800 miles; traversing turnpikes, highways, dirt roads,



LE MANS START from Rockefeller Plaza in mid-town New York drew a large crowd of passersby.

mountains, bridges and ferries.

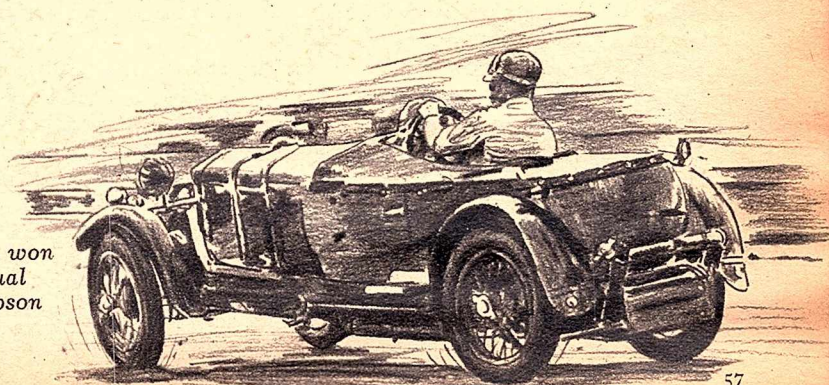
The quaint caravan of 22 gleaming antique and classic cars—relics of the era of goggles and “Excuse my dust”—did itself proud. Although the home team won, our worthy opponents almost pulled the fat out of the fire. In a tremendous last-minute effort they gave the American team a shellacking in the accelerating and braking tests at Bridgehampton, Long Island. But the

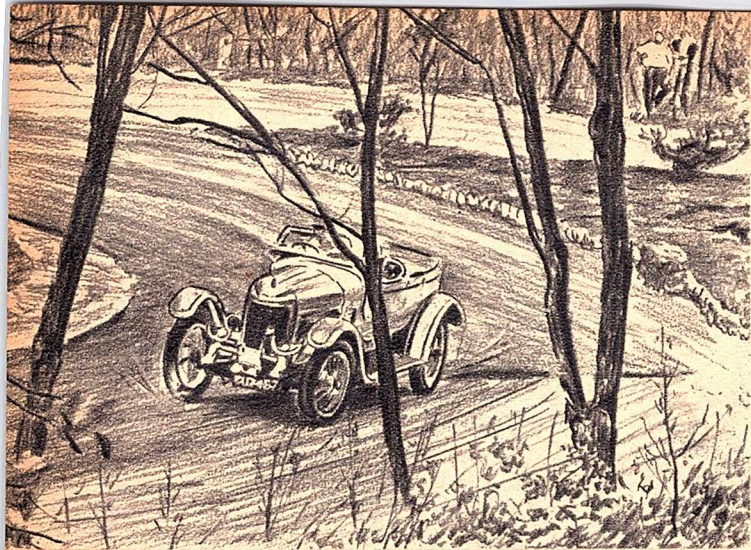
final score, using the penalty scoring system, was Britons—3,074 penalty points; Americans—2,359.

In the 1905-15 group for the British were a 1908 Hutton, 1910 Rolls-Royce, 1913 Lanchester, 1913 Talbot, 1913 Vauxhall. Senior buggies for the American club were a 1909-10 Chalmers, 1911 Pierce Arrow, 1911 Simplex, 1913 Lozier, 1914 Simplex.

British cars in the 1915-29 class were

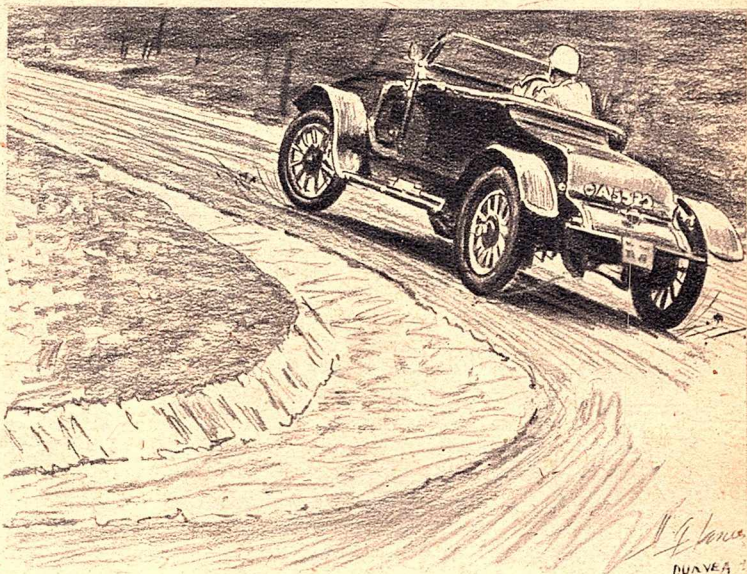
1927 FRAZER-NASH driven by Alistair Pugh won award for best individual performance at Thompson Gymkhana.





1913 VAUXHALL rounds a picturesque bend on Duryea Drive in the hill climb at Reading, Pa.

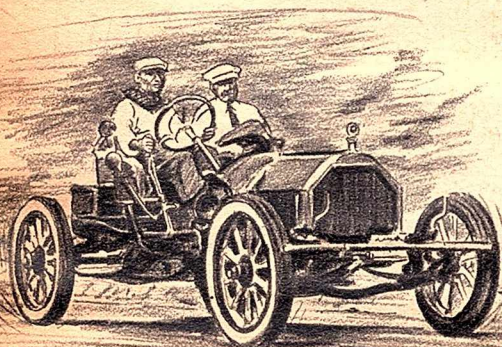
1909-10 CHALMERS with owner Fred Haller of Pennsylvania at the wheel on its way back down. The venerable car did well in every event.

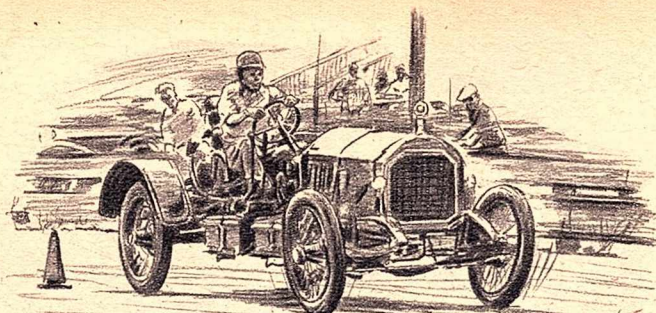


1913 TALBOT roadster driven by B. M. Clarke of Britain drifts a hairpin turn on its way up the hill.

a 1920 Vauxhall, 1925 Alvis, 1927 Sunbeam, 1927-28 Frazer-Nash, 1928-29 Bentley. Matching these on the American side were a 1916 Pierce Arrow, a 1922 Mercer, 1928 Ford, 1929 DuPont, 1929 Studebaker.

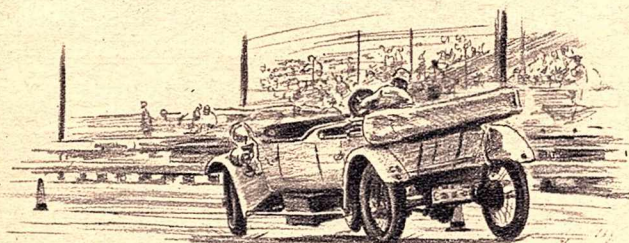
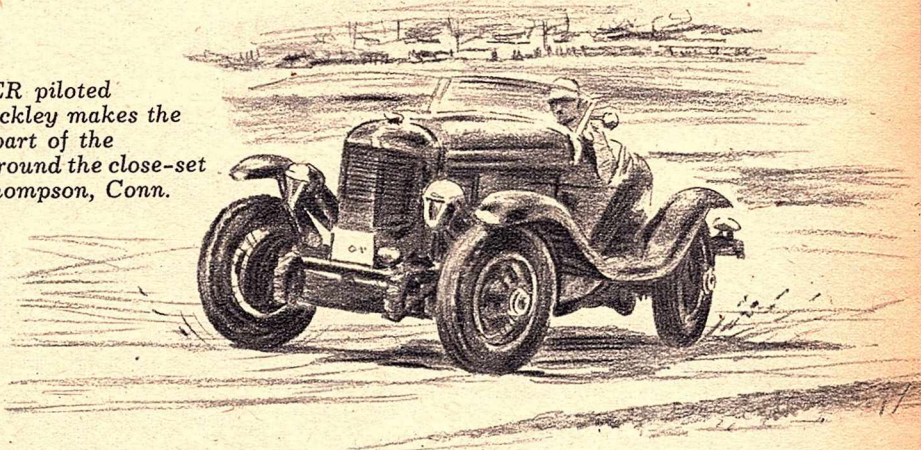
The active phases of the rally began with a timed Road Section along the Pennsylvania Turnpike after passing through New Jersey. Then there was the hill climb at Reading, Pa., Timed Easy Starts at Skytop, Pa., Quarter-mile Standing Start and Braking Tests at Bridgehampton, N. Y. Stop and Restart in Brookline, Mass., and the Gymkhana at Thompson, Conn. •





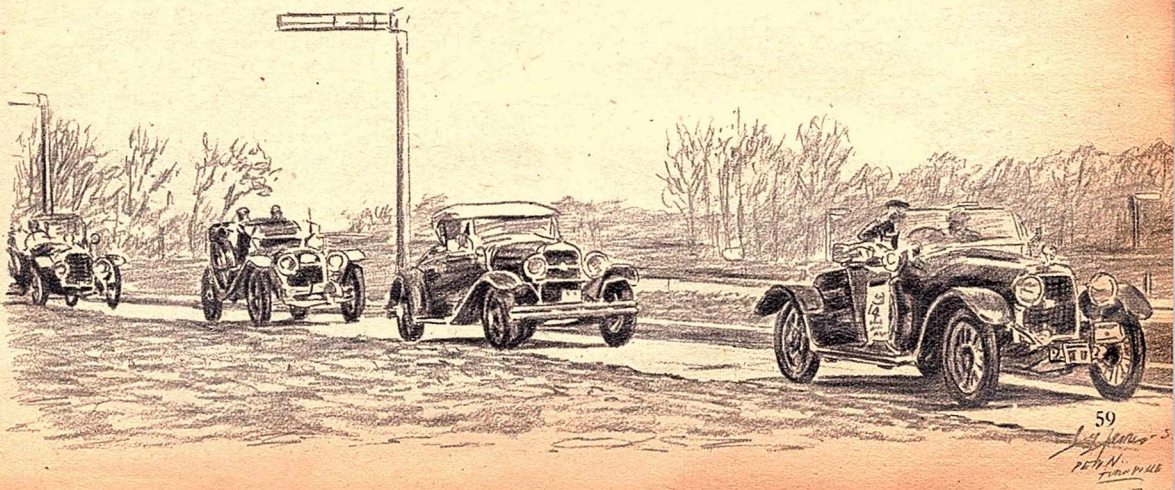
1908 HUTTON was driven by the colorful Steady Barker, a member of the staff of the British automotive magazine Autocar. Camber of those front wheels is worthy of note.

1922 MERCER piloted by Ralph Buckley makes the big turn in part of the Gymkhana around the close-set pylons at Thompson, Conn.



1913 LANCHESTER driven by Francis Hutton-Stott proved to be a rugged car indeed, often swinging hard on its springs but never breaking traction.

EN ROUTE—after a lunch at a restaurant in Neshaminy, Pa., the cars pull out onto the Pennsylvania Turnpike for their first timed run.



Dear Santa:
Here's what we want for Christmas.
-The Editors

Photos by Morris Rosenfeld



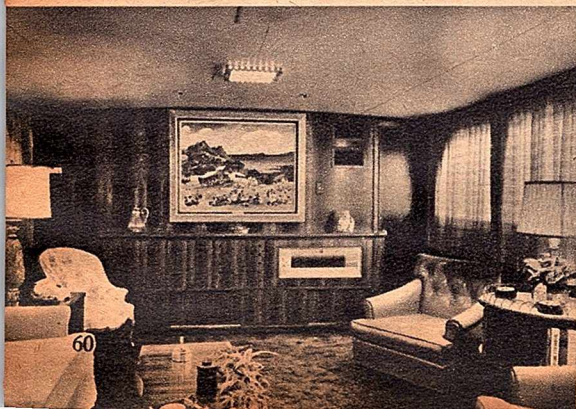
NEVER mind the two front teeth—we'll settle for a replica of Alisa V, the newest in a series of Alisas owned by Elmer H. Bobst. Mr. Bobst is Chairman of the Board of Warner-Lambert Pharmaceutical Company, Morris Plains, N. J. Alisa V was designed by John H. Wells, New York, and built by

Broward Marine, Inc., of Ft. Lauderdale, Fla.

This modern dreamboat is 96 feet long, has a 19-foot, six-inch beam and a six-foot draft. She was the largest yacht built in the U. S. in 1956. Her hull is of laminated Philippine mahogany. Power is supplied by two 12-

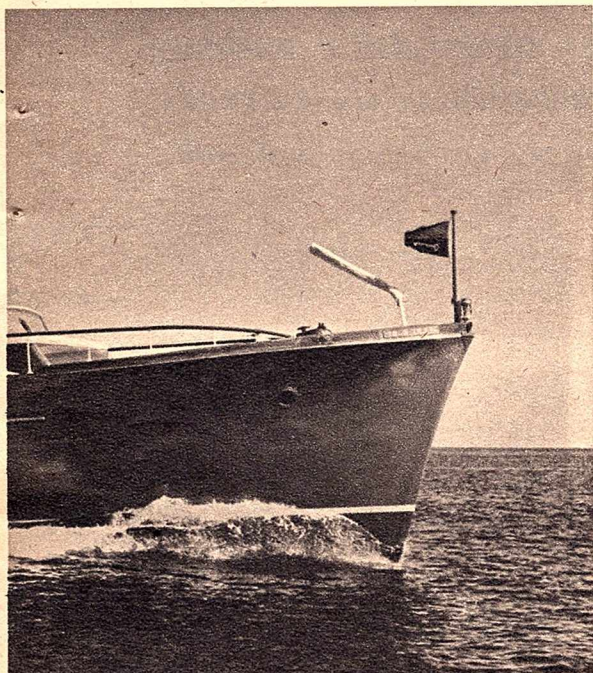
ROSEWOOD LIVING ROOM has built-in bar, 100-record player, tape hi-fi, radio.

DINING SALON seats up to 12 at avo-dire and rosewood table, has two buffets.



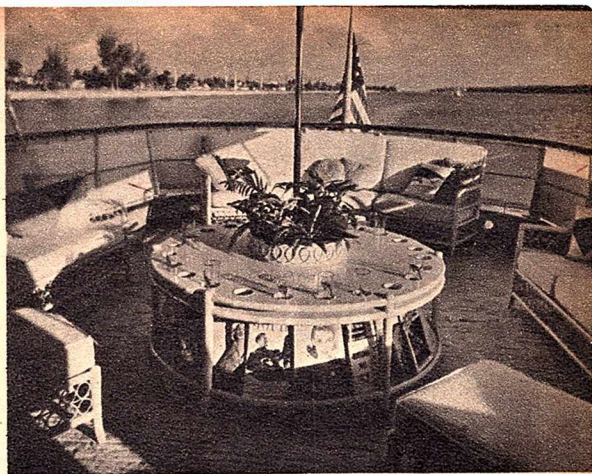
*It's Cleopatra's barge
with twin 600-hp diesels.*

MODERN DREAMBOAT, 96 feet overall,
has a hull of laminated mahogany planks.

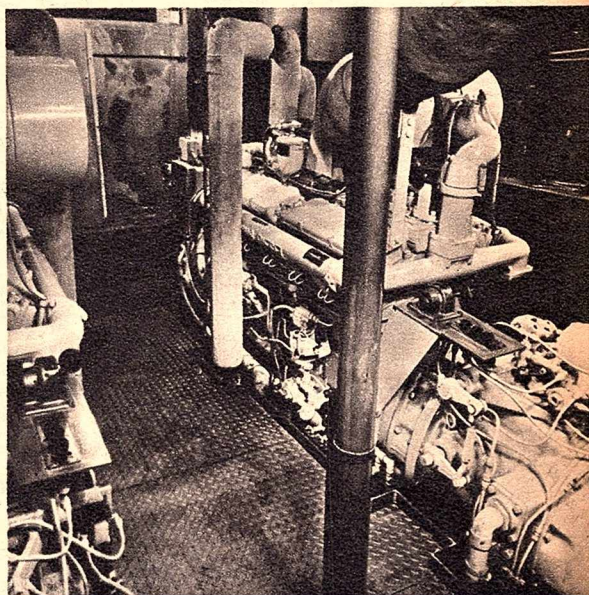


cylinder Cummins supercharged diesels. Alisa V's top speed is 15.3 knots and she cruises at 14. She has a luxurious after lounge deck, 19'x17'6"; a 20'x14' living room, a 20½'x13' dining salon; four staterooms; two baths and two showers for owners and guests. The cost? Don't ask! •

GLASS BULKHEADS make lounge deck seem like an extension of the living room.

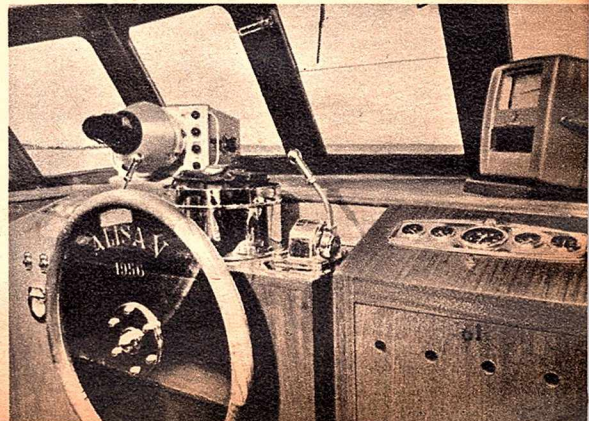
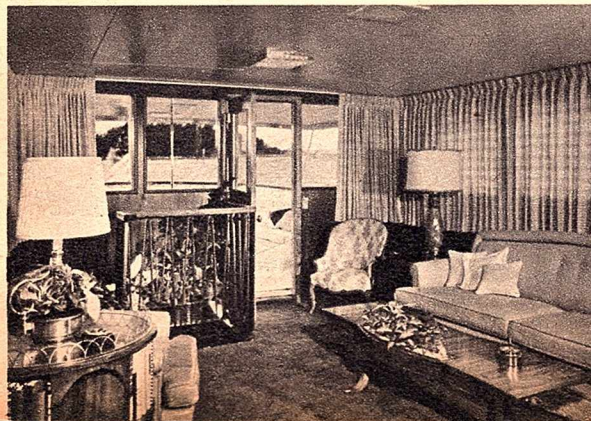


AFTER LOUNGE DECK—space, elegance, and comfort—a place for royal relaxation.



POWER PLANT—twin Cummins 12-cylinder diesels. Each engine develops 600 hp.

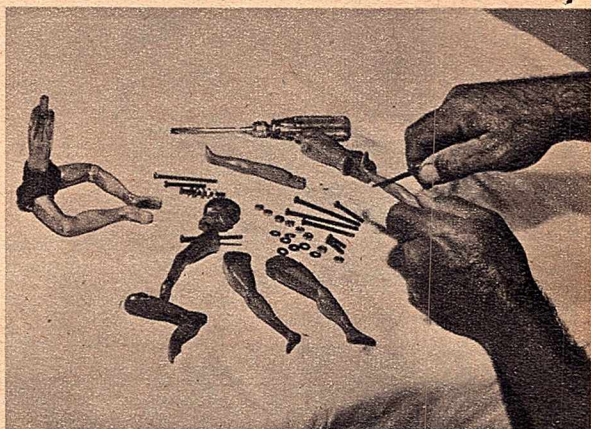
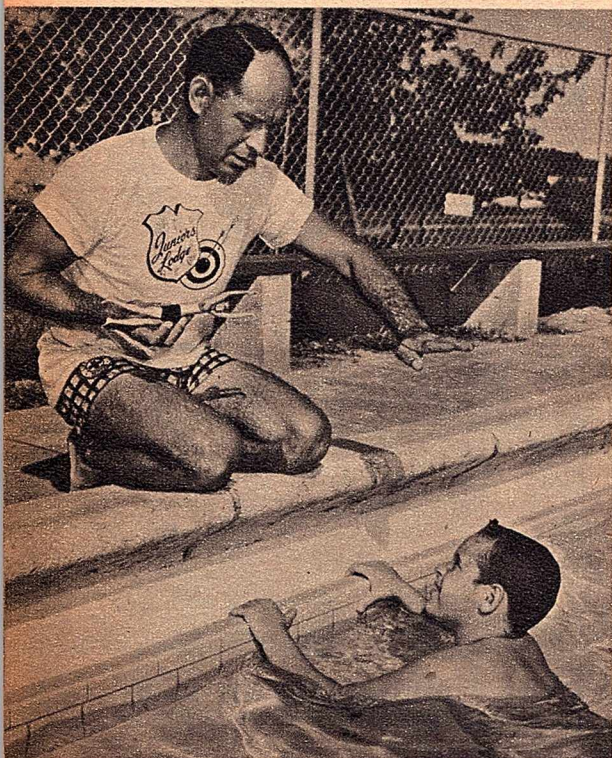
PILOT'S AIDS include radar, electronic pilot, depth finders, and radiotelephone.





Swimming Doll

*A little wooden doll is teaching
Ft. Lauderdale swimming pupils
how to do everything but sink.*

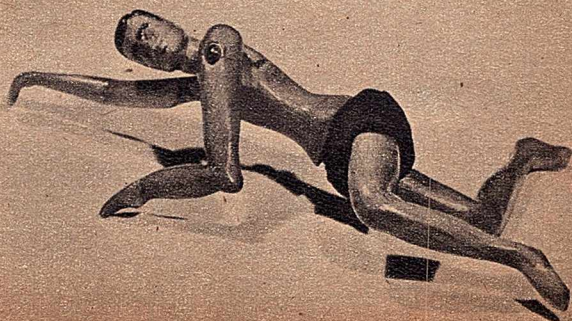


CHANGEABLE LIMBS are needed so that Leander can illustrate various strokes.

AT POOLSIDE Dr. Marshall explains the crawl to a pupil as Leander shows how.

SIDE STROKE demonstration by tireless Leander saves wear and tear on instructor.

SWIMMING dolls are helping Marsh A. Marshall of Ft. Lauderdale, Fla., to teach up to 60 weekly pupils the A-B-C's of natation. A retired dentist, Marshall carved the figures himself to use as demonstrations of the various swimming strokes and techniques. The doll in the pictures is named Leander after the youth who swam the Hellspon: a female doll is called Florence Chadwick. •





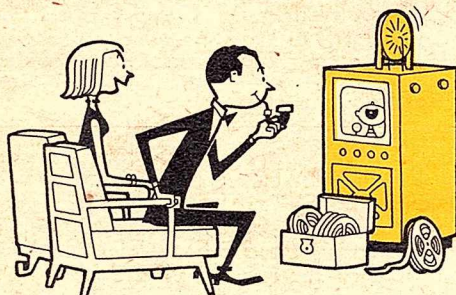
INFLATABLE LUNCH BOX that could be deflated and tucked in your pocket after the noon meal. Bill Merce, Franklin Park, N. J.



THROW-AWAY sheets and pillow cases for use when you have overnight guests in house. Mrs. Louis Strack, Sr., Little Rock, Ark.



MOVABLE sink faucet that will go up or down to allow filling of unwieldy pails, etc. William Wiersema, Jr., Oconomowoc, Wis.



HOME MOVIES on your TV via device capable of running 16, 35mm film through picture tube of set. Pete Massari, Cincinnati, Ohio.

INVENTIONS WANTED!

Is there a gadget you think should be invented? If so, send its description to Inventions Wanted Editor, **MECHANIX ILLUSTRATED**, 67 West 44 St., N.Y. 36, N.Y. Each one printed will be awarded \$5.



TAPE RECORDINGS of your favorite fragrances with which you could relax, sniff and remember. Mrs. J. Hult, Mantion, Calif.

PREVIEW OF

Here are the new developments, designs and gadgets you'll be seeing in the '58 models.

By Stanley H. Brams

WE have long since gone beyond the time," said one of the auto industry's leaders in a private conversation, "when we could make a routine facelift and expect to have a big market for new model cars."

That viewpoint tells you a good deal about the thinking and planning for the 1958 automobiles. The changeover won't be nearly as broad as the one that led to the current models—which inspired one observer to call 1957 a "vintage year." But there will be plenty of advances nonetheless. Detroit is going to make sure that its 1958 offerings will have enough to whet the appetites of the customers.

Stylwise, car heights will be lower and once again will look closer to the ground than they really are. Mechanically they will be more powerful, more agile and capable of both easier riding and easier stopping.

Those last two points, riding comfort and braking ability, may be the high points of the 1958 model year. The most intensive engineering thinking is going into suspension systems and brake systems.

When Cadillac pioneered the air-suspension system with its El Dorado Brougham, it pointed the path that every maker will soon be following. Air-suspension will almost certainly be seen

PLYMOUTH: Reportedly going to air suspension. Slight design changes but no new body shell until 1959. Rear fins may be lowered slightly for better body integration. Lower front grille. Rumored new high hp engine.

DODGE: Will also pull in its fins slightly but no major style change until 1959. Expected to be lower with door-opening cutting somewhat higher into the roof. May offer optional fuel-injection later in the year.

DESOTO: Minor body shell changes. Reported all new engine with increased hp. Lower silhouette. Selling emphasis on heavier models with more extras.

CHRYSLER: Electronic fuel-injection may be offered later in the year. Slightly smaller rear fins. No major body design changes.

IMPERIAL: Possible use of air bags for rear wheel suspension. No major body design changes. Increased hp. Transmission may be moved rearward to allow lowered body.

FORD: Air-suspension may be offered. All-new engine with increased hp. Fuel-injection to be optional. Minor body changes but probable complete redesign in 1959. New gadgets: Radio receiver in trunk "remembers" station setting when signal is broken by underpass.

New "horn hearer" flashes light on dash when driver behind blows his horn.

EDSEL: First brand-new standard car since 1950. Reported in four lines: Pacer, a four-door hardtop; Ranger, a two-door hardtop; Corsair, a convertible; Roundup, a station wagon. Price range: \$2500 to \$4000. Expected to offer close to 300 hp, air-suspension, optional fuel-injection. Square rear deck, wrap-around bumper, rear lights half on trunk lid. Transmission buttons mounted on hub of steering wheel. Silhouette similar to Mercury but with paired headlights divided by center prow. Single-shot lubrication system offered on at least one line.

MERCURY: New model, Citation, will overlap into Lincoln price range, offer upped hp, air-suspension. Minor design changes.

LINCOLN: Integrated (unitized) body-and-frame construction pioneered by Nash. Minor styling changes reported include increased use of chrome, increased glass area and a slightly lower silhouette.

CONTINENTAL: The Mark III, which may be offered at \$2,000 less than current model, will become top line in Lincoln. No more Continental Division of FoMoCo. Four-door hard-

THE 1958 CARS

in 1958 on the volume cars of the industry—Chevrolet, Ford, Plymouth. It may also appear on a number of other makes as well.

But the systems you'll find on the '58 cars won't necessarily follow the Cadillac approach. Cadillac, you'll remember, located a diaphragm-type air-dome at each wheel. Compressed air was fed into these domes and a piston rod played against this layer of compressed air to provide springing.

Air-suspension systems under study in other car companies have generally followed another tack. Many of them consist of a kind of horizontally-mounted doughnut or bellows which is positioned between chassis and frame and damps out road jars.

That kind of air-bag system, coupled with leveling devices, may be adopted by several makes. A number of clues indicate this. The Firestone Tire & Rubber Co. is tooling a plant in Indiana

for the exclusive production of air-springs—which Detroit interprets as meaning that the various Ford Motor Co. lines will be so equipped. The name Torsion-Aire, employed for the Chrysler Corp. torsion-bar suspension system, is taken to mean that air-bags will be used in 1958 for the rear wheels—else why the employment of the Aire part of the name? And, everyone agrees, these signs would strongly imply that competitive-minded Chevrolet will also be marching in the air-suspension parade.

Air-suspension can make a great deal of difference to automotive frame concepts; the fact that air-bags were in the offing was probably responsible for many of the extensive frame revisions which came along in 1957. It looks as if some of those frames were designed to give flexibility at the wheel corners, despite the greater torsional rigidity generally built into them. A bit of flexibility at the corners would go

top model will be pushed. Optional air-suspension and fuel-injection.

THUNDERBIRD: New four-passenger model. New unitized frame.

CHEVROLET: Drastically restyled with silhouette dropped three to five inches. Conservative fins will enclose rear deck. May also adopt X-frame or unitized construction. New model: luxury-styled Impala with new V8 engine and greatly increased hp. Air-spring suspension on standard lines.

PONTIAC: Brand-new body lowered three to five inches. Increased hp. Air-suspension and fuel-injection may be optional. May go to X-frame or unitized construction.

OLDSMOBILE: Major design changes; slightly lower with increased glass area. Trend to heavier models with added equipment. May be offered with optional fuel-injection. Possible new transmission system, similar to Chevy's. Door frames reaching farther into roof. Return to one-piece rear window.

BUICK: Radically redesigned throughout with added optional equipment: air-suspension, fuel-injection, air-conditioning, etc. Increased glass area and upped hp. Return to

one-piece rear window. Triple turbine automatic transmission on all lines.

CADILLAC: Minor body changes. Air-suspension may be available on all models, as well as other gadgets pioneered by El Dorado Brougham. Electric buttons to open and close doors being studied. Height of rear fender fins may be increased.

CORVETTE: Improved models of SS (Super-sport) slated for development. Increased hp and slightly lower silhouette.

RAMBLER: Reported to be planning all-new look with completely redesigned body shell and substantial changes in power plant for increased hp and mpg.

HUDSON-NASH: One report has these cars disappearing completely in '58 with all company emphasis on Rambler. Another possibility is complete redesign job with new engines.

METROPOLITAN May offer four-door, four-passenger station wagon.

STUDEBAKER: No radical changes in body shell. May have upped hp with optional fuel-injection on more expensive lines.

PACKARD: No major changes reported. Rumors of dropping the line denied by factory. May bring out Packard Hawk line. •

well with the softening effect of air-suspension. At least one X frame is in prospect for a 1958 volume car; its crosspieces will make an admirable assembly with air-bags.

If you wanted to go into the wild blue yonder, you could guess that air-suspension will be employed in passenger cars as in commercial vehicles—in conjunction with the braking system. A common reservoir would service both brakes and air-bags.

That may be some distance away. Meanwhile, the 1958 outlook is that brakes will be beefed up by every conceivable means.

The limits of square inches of braking surface have been reached on practically all cars, so the search is in other directions.

One approach is within the transmission system. Chevrolet pointed the way in 1957 with its hill retarder—a clutch on a rear planetary gear-set that engages it to the first turbine. When that happens the turbine pumps oil toward the converter—the reverse of customary flow—and thereby actually uses the engine as a brake. It can be expected that the three-turbine system of Chevrolet's Turboglide will be adapted by other engineering departments which have been racing over since mid-1956 to get production okays. Buick is moving fast in this direction.

Buick may likely have another braking innovation on its 1958s, one that will be less a departure than a hill retarder. Its Roadmaster 75, a luxury car shown early in the spring, boasted front wheel brakes of aluminum with fins around the circumference for air cooling. Aluminum is a new material for

brakes in this country. One of its virtues is presumably its heat transfer characteristics; the fins provide for heat dissipation in the airstream around the wheel. If precedent is followed, this special development of 1957 will be followed by more widespread use in 1958.

Another approach for improved brake systems lies in a completely new kind of direction—the electric field. You know how an armature is spun in one direction or another, at varying speeds, in the electric field created by the conductors of a motor. An enormous amount of research has been

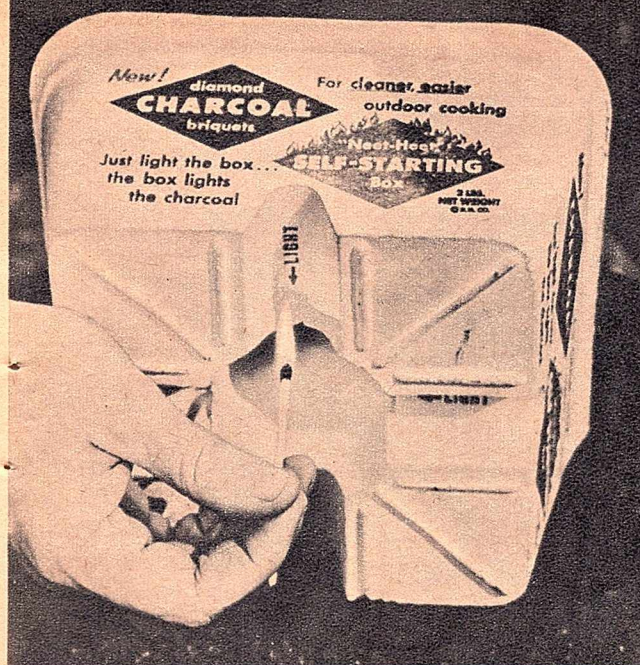
going on to see if the principle that operates the motor can be adapted to braking. That is, an electric field would be created whose invisible flow of electrical force could control the speed of the shaft (which might in this case be the axle) as effectively as the contact surfaces of brake shoe and lining.

You may see it in 1958. You may see it later. You may not

see it at all if the bugs aren't worked out. But electrical braking seems one of the highly promising avenues of study as the engineers try to bring auto brakes up to parity with auto power and speed.

Enginewise, the big news for 1958 will be the same big news as for a succession of past years—more power output. The new models will advance their horsepower right across the board. Competitive pressures are one reason. Another is the objective that Ford engineers have lately been talking about publicly—to provide enough raw power under the hood to make a multi-stage transmission as useless as a human appendix. At that point, presumably, the engine will be [Continued on page 183]

"The big news for 1958 will be air-suspension, fuel-injection, increased horsepower, beefed-up braking systems, lowered bodies and larger glass area. Electric brakes and free-piston engines are now in development and may be ready by 1959."



STEP ONE—you touch a match to the arrow on the bottom of the pulp carton.

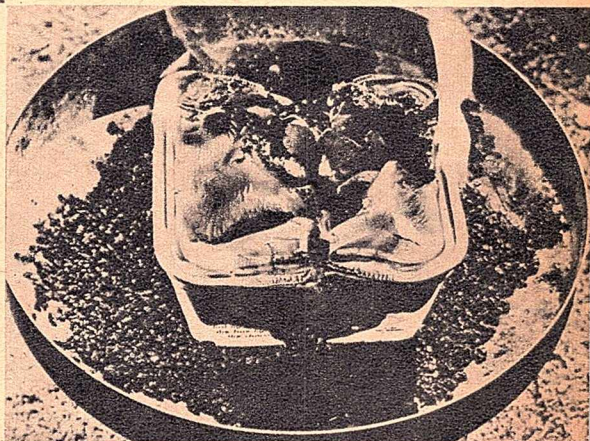
ALL you need to start a charcoal fire now is a match—and the makers of the new self-starting fire will sell you that, too, for a very modest price. The Diamond Match Company makes a lot of interesting things besides matches and one of them is a clean, tidy container of charcoal that needs no kindling, no gasoline, no paper—you just light the box and in a few minutes you're ready to start cooking. A level bed of sand or gravel to cuddle the coals is good for this fire as for all wood or charcoal fires. One box will do a 90-minute cook-out, costs less than 40 cents. •



MI will award \$50 each month to the first person who tells us of a new and useful gadget that is patented and in production. Manufacturers are also eligible for this award. Pictures and a description should be sent to Bright Ideas Editor, Mechanix Illustrated, 67 West 44th Street, New York 36, N. Y.

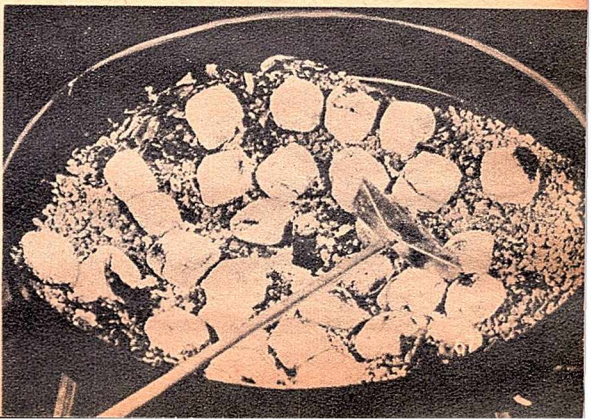


NEET-HEET BOX

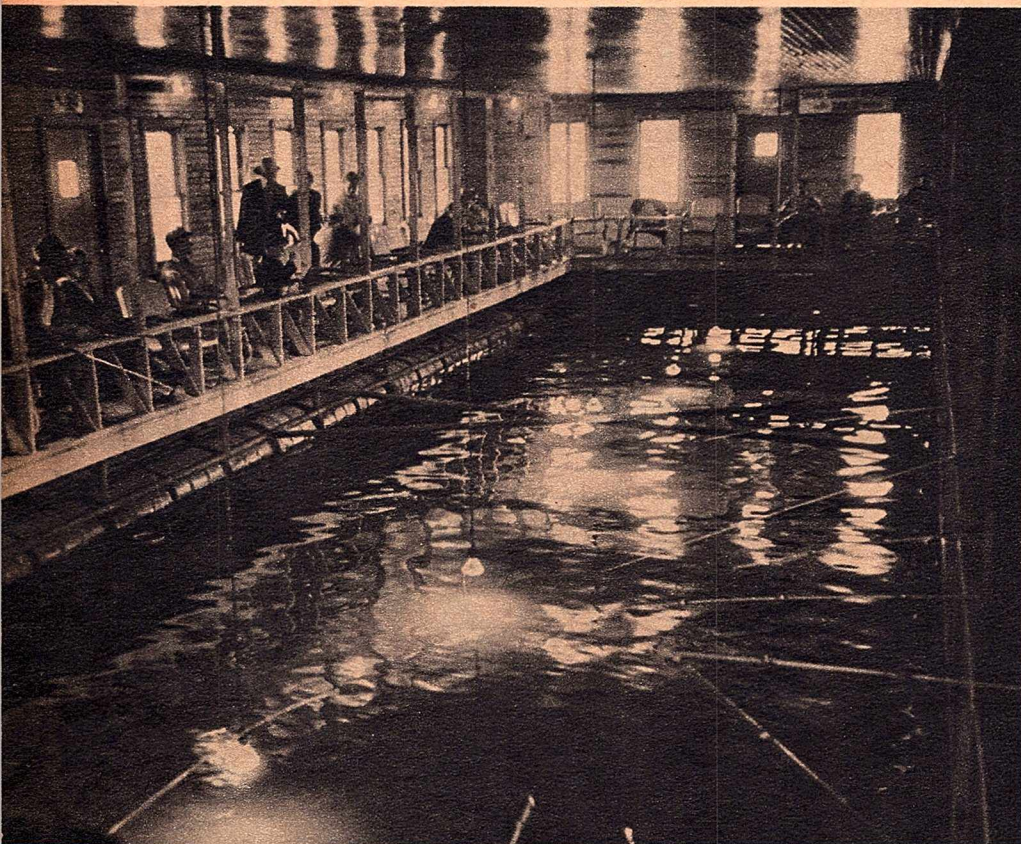


STEP TWO—wait. It takes about 20 minutes for the briquets to get to white heat.

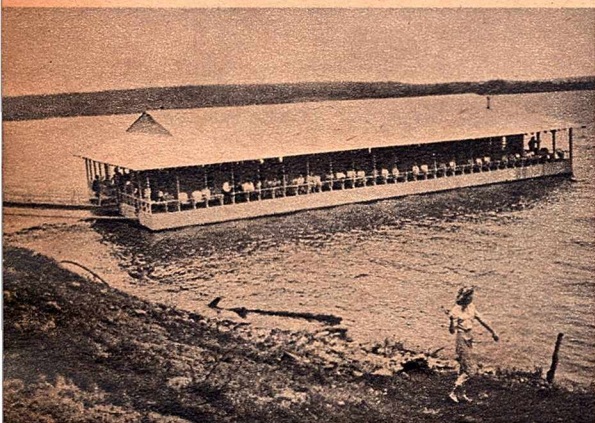
STEP THREE—when the coals are glowing, just spread them out evenly, as shown.



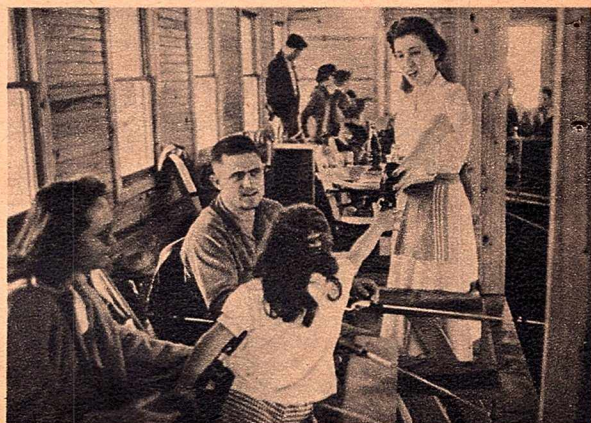
Now You Can Fish Indoors



INDOOR ANGLERS skip the inconveniences of boats and the winter winds at Snug Harbor, one of the new year-round fisheries.



OUTSIDE VIEW of Snug Harbor; you can fish from the porch as well as the parlor.

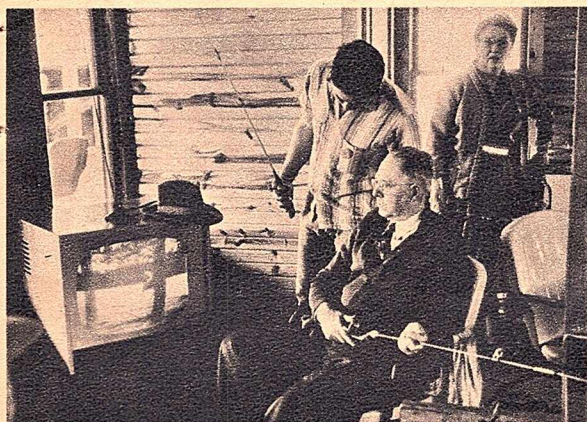


FAMILY FISHING with restless children is more fun here than out in a boat.

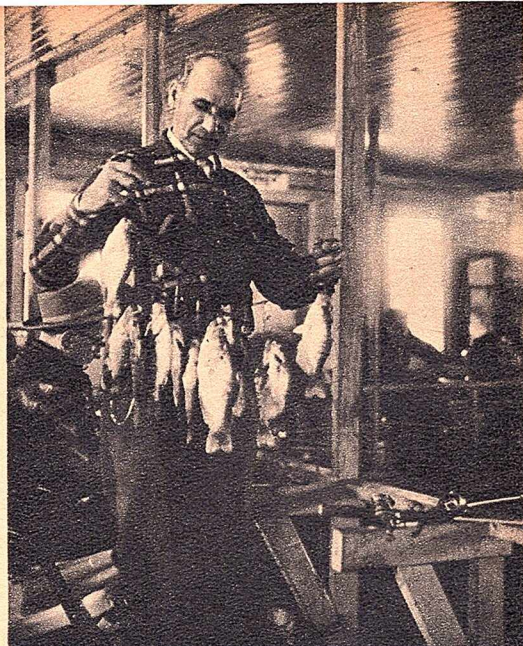
VACATIONERS and weekenders in Oklahoma are going big for a new resort lake feature—indoor fishing docks. In these homely but comfortable establishments you can fish while playing cards, watching TV or sipping hot coffee. If you have kids with you they can fish as long as they want to, then divert themselves with a bottle of pop or an exploration of the beach without ruining your day. In the winter the fisheries are heated—which means that only people in training for polar expeditions prefer boat fishing. Resort trade men find the new docks are turning their seasonal business into a year-round success.

Among the patrons of Snug Harbor on Fort Gibson Lake, near Tulsa, are any number of lady anglers, 70 wheelchair patients and two ardent fishermen who fish from stretchers. Last year 23,000 customers paid a dollar apiece to use the Snug Harbor docks, one of them a fixed dock and the other a floating one. Both docks are heated in winter by blower furnaces hanging from the ceiling. The fuel is propane which doesn't freeze. Both docks are insulated with fibrous glass which keeps out the heat in the summer. This is sport for folks who hate the discomforts of fishing. "What I like about them," says one lady, "is you don't have to get into a boat." •

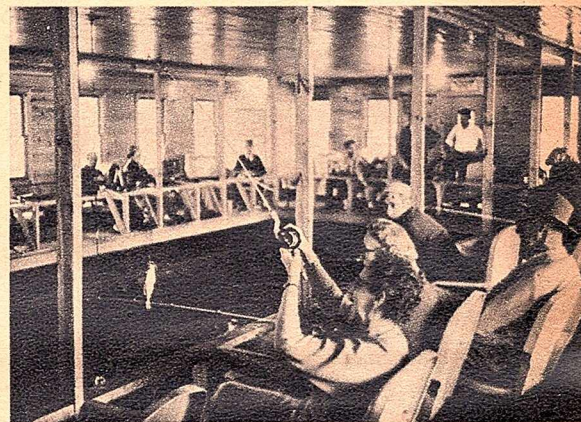
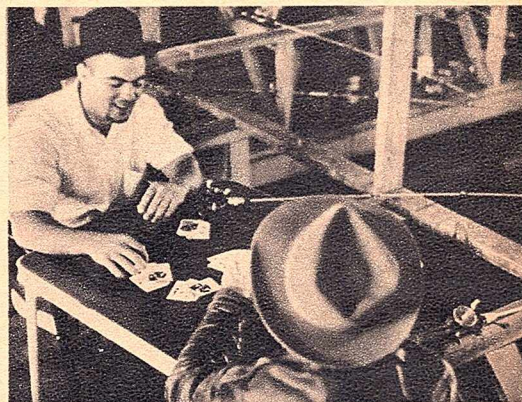
CARD PLAYERS assuage consciences by fishing as they while away their vacations.



TV VIEWERS at Snug Harbor have no interruptions except from the hungry fish.



REAL FISHING, too, for crappies, sand bass, white and black bass, channel cat.

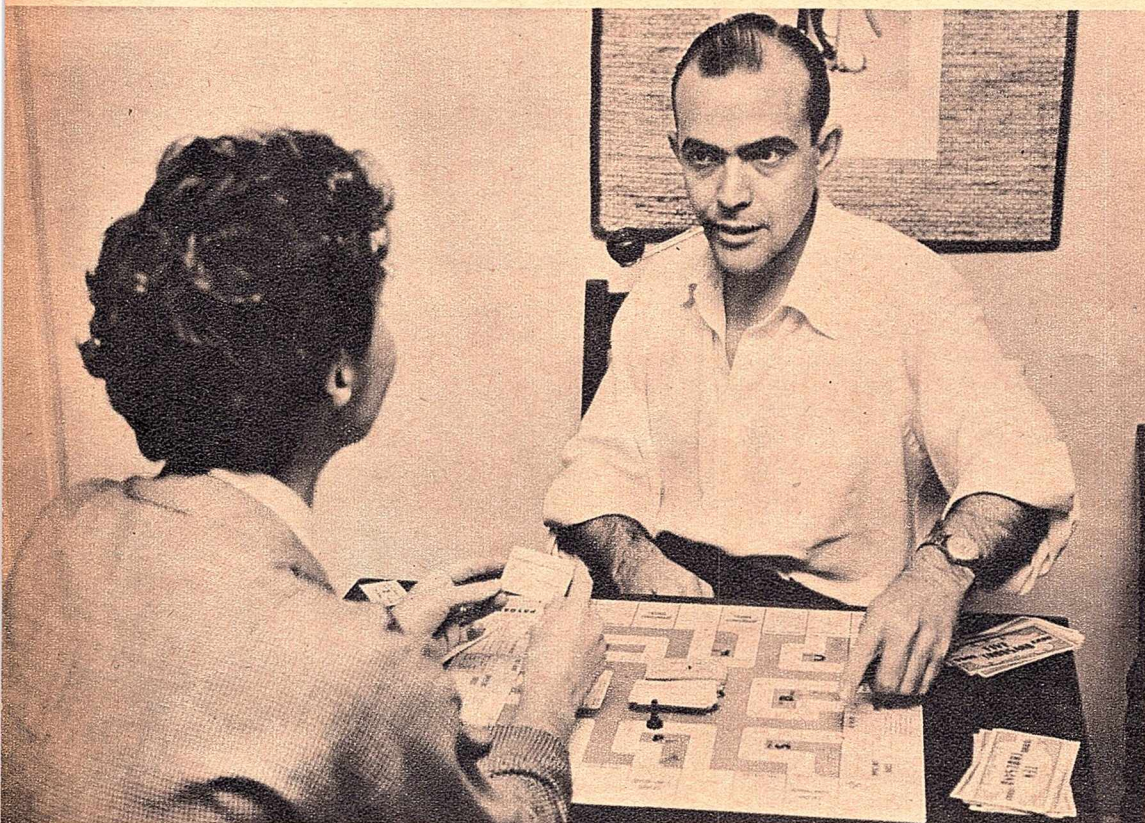


LADY ANGLERS are regular patrons; a number have husbands who hate fishing.

**MONEY
MAKING
IDEA**

HE MADE A CAREER of "CAREERS"

By Holcomb Kerns



CAREERS' inventor Brown and wife. He played 700 games by himself to thoroughly test it.

Creator of an exciting new game, college professor James Brown may earn a fortune.

GAME manufacturers say a truly sensational game comes along only once or twice in a decade. Careers, a game invented by Dr. James C. Brown, an assistant professor of sociology and the humanities at the University of Florida, may be one of them.

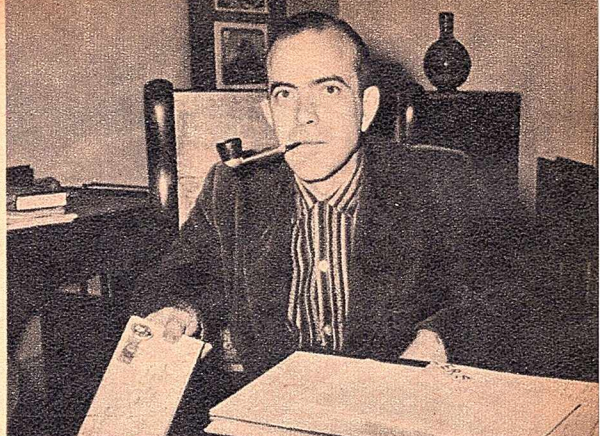
Parker Brothers, the largest manufacturer and distributor of games in

the business and known best for Monopoly, is now marketing Careers. According to a company spokesman, "It's the most promising game we've seen in 50 years."

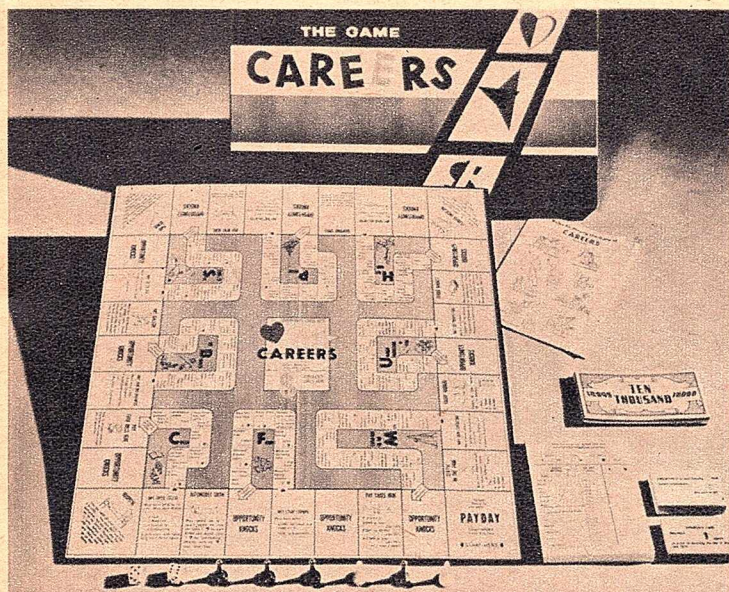
Careers is a board game and comes with tokens, paper money, counters and dice. Brown decided that Careers would have to move fast and force the

players to take an interest in what the other players are doing. As a result there is more bargaining in Careers than in other games and it is a neck-and-neck contest until the game is over. The object of the game is to succeed in your career—money, fame or happiness depending on which of them or which combination you choose.

The idea for Careers hit Brown in 1950 but it wasn't until three years later that he really rolled up his sleeves and went to work on it. He reasoned that nearly everyone is faced, sooner or



REVISIONS of game were detailed in letters Brown sent to himself via registered mail he left unopened to protect ideas.



DESIGN of Careers' board and implements was done by inventor. First board was so good it was left virtually unchanged.

HARD WORK went into Careers for rules were revised 15 times by Brown before he decided game was ready for the market.

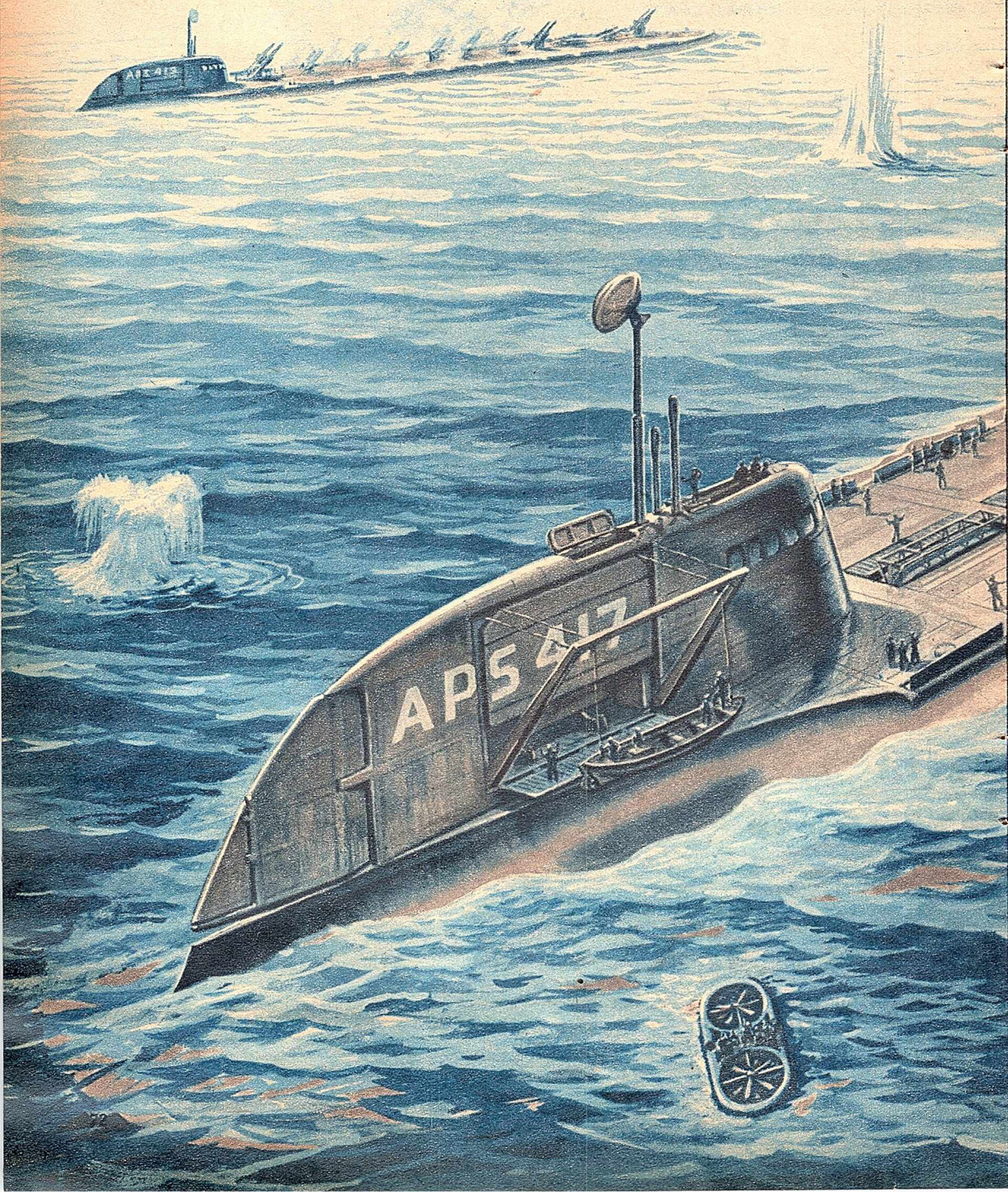
later, with a career decision. It was on this assumption that he based his game.

The first thing Brown did was to design the board on which Careers is played. He worked on the game itself for about six months during his spare time. He played it with some relatives in Minneapolis and a local toy maker heard about it. He came out to see the game, played it and made Brown an offer. Brown declined because the toy maker wouldn't agree to let him work on his staff and complete Careers' development before marketing.

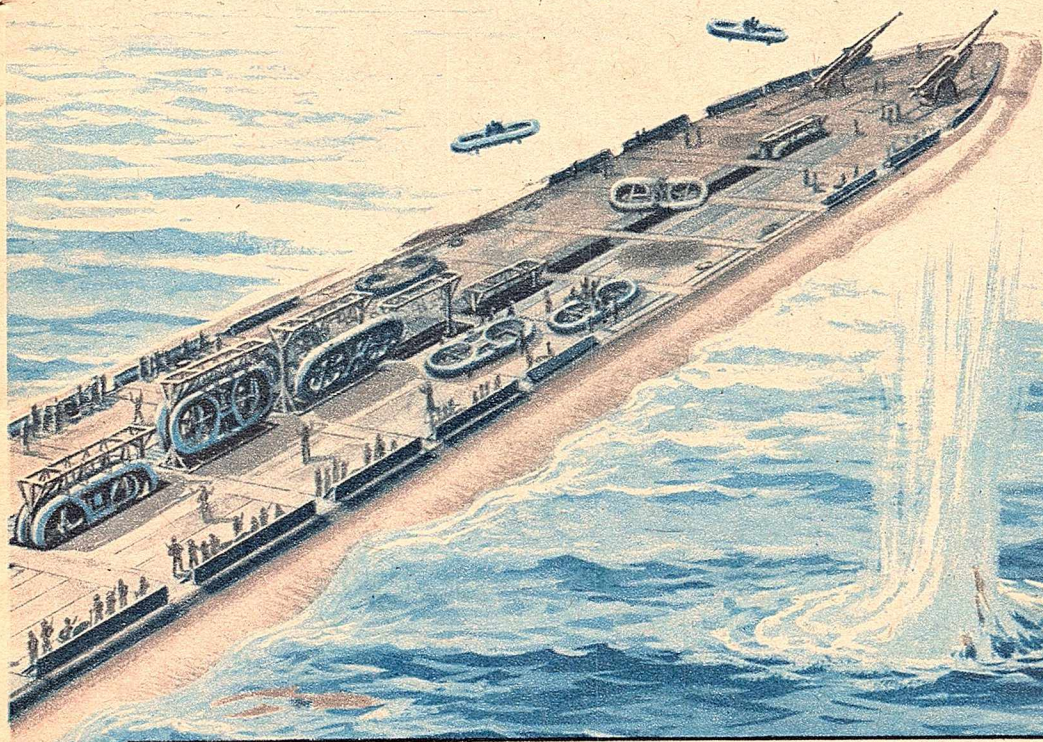
Brown believes that the invention of a game, just as any other invention, should be approached on as scientific a basis as possible. One of the most important [Continued on page 174]



Why Don't We Build **Giant Submarine**



Carriers



ASSAULT SUBS launch airborne Marines swiftly against a hostile beach.

*Massive assault subs
would make all enemy
coast defense futile.*

By Frank Tinsley

ADVOCATES of the submarine are not at all surprised at the news that the Japanese are building a 30,000-ton submarine tanker. As MI has been pointing out over the years, subs are the coming thing—the key to low-cost, fast, weather-free ocean transportation of all kinds. And even as a war weapon the sub is only beginning to come into its own. The sub you see above, MI's latest contribution to speculation on war technology of the near future, illustrates

one of the inevitable uses of the underwater ship.

Our giant assault sub, as you can readily see, is not of the traditional cigar-shaped type. It's made up of five cigar-shaped hulls—a sort of underwater catamaran. The reason for this design is that a cigar-shaped sub of this size, with 10,000 tons displacement and a keel-to-conning tower height of 100 feet, would not be useful in water less than 200 feet deep. Hence the flatfish profile.

Why retain the tubular hull at all? Because of its tried and proven strength to resist the terrible pressure of the ocean depths.

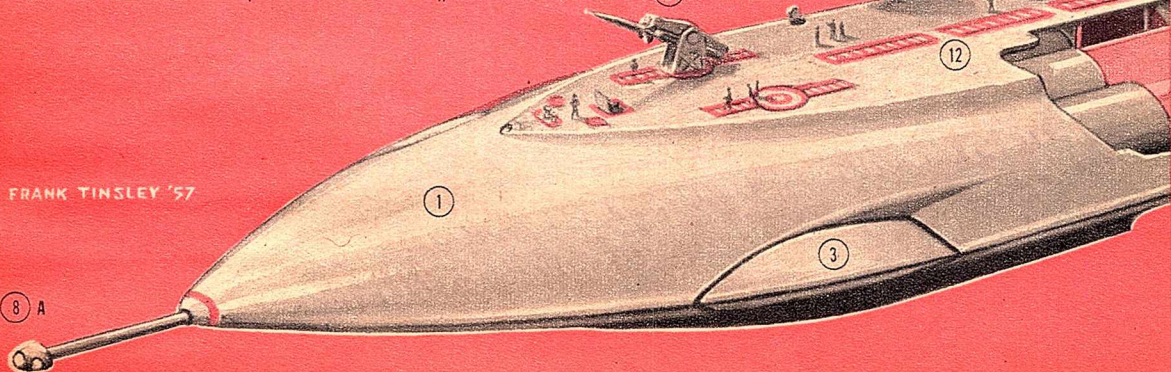
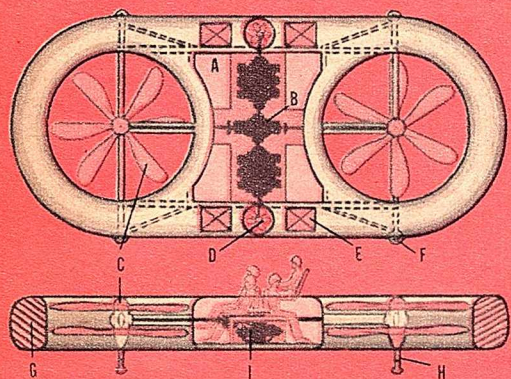
The bow component of our sub contains ground tackle, diving rudders and a battery of surface to air missile launchers. It may also be equipped

with a horizontal TV periscope to add a degree of underwater visual observation to the blind sonar gear.

The body of the sub contains troop or cargo facilities, hangar space or missile storage depending on the use to which the hull is put. Above is a 48x300-foot flight deck, from which 20 squad-size "air rafts" can be launched at one time.

In the stern component are the operating controls, crew quarters and power plant. The conning-tower-directional fin houses periscopes, retractable radar mast, small boat stowage. The structure gives great stability to the vessel and the outsize rudder gives sharp control of direction. Under the stern component the two skid heels terminate in skegs housing the propeller shafts and smaller vertical rudders. Twin horizontal rudders are built into the flat fish-tail stern,

1. Bow compartment for mooring gear; 2. Retractable missile batteries; 3. Diving vanes;
4. Central cargo hold; 5. Stern compartment: controls, crew quarters, powerplant; 6. Conning tower with vertical rudder; 7. Control bridge levels; 8. Radar mast and periscopes;
- 8-A. Underwater TV scope; 9. Small boat stowage; 10. Atomic-steam propulsion plant; 11. Horizontal rudders; 12. Flight deck; 13. Hangar deck holds 40 air rafts; 14. Bilge sump with pump; 15. Air rafts stowed on elevator; 16. Loaded elevator rising to flight deck; 17.



FRANK TINSLEY '57

on either side of the keelson which contains the after hawsepipe and anchor.

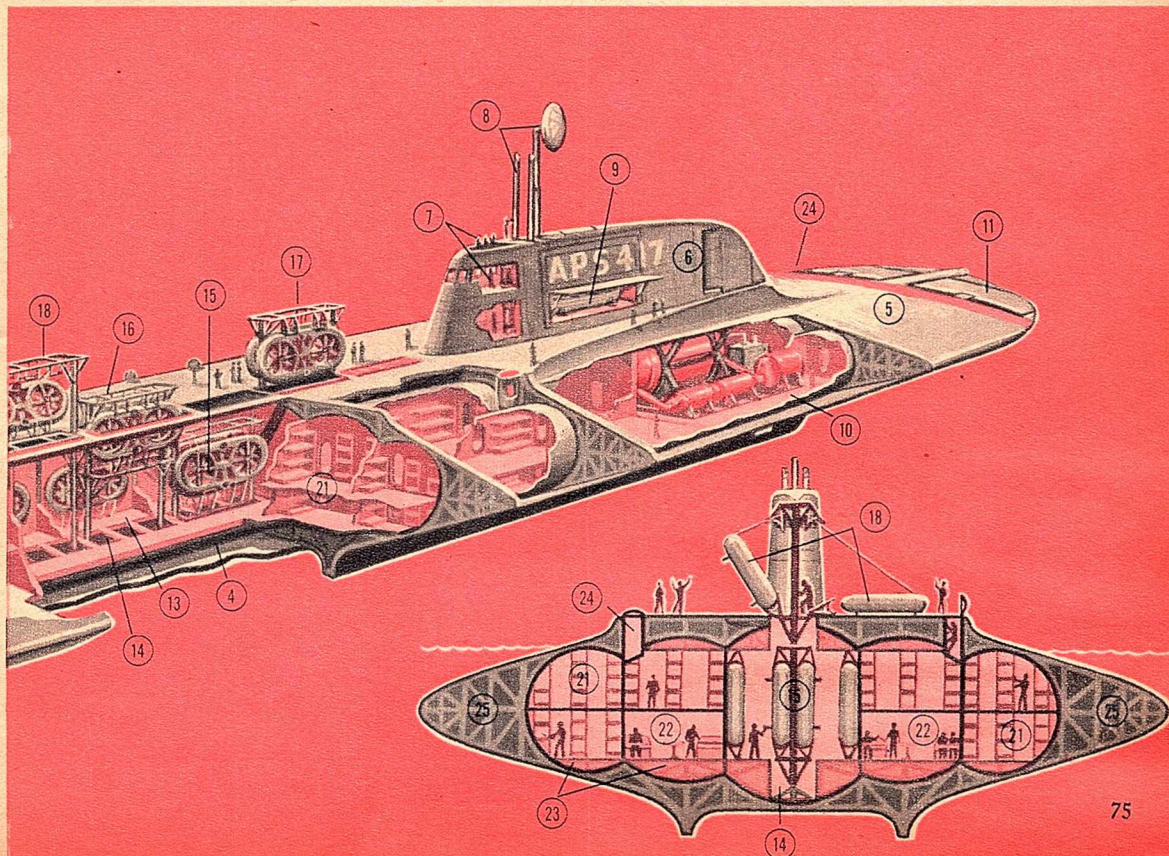
MI's submarine is 720 feet long with a beam of 124 feet. It can carry 2240 Marines in addition to crew, as well as 40 air rafts. The air rafts are twin-engined, airphibious flying platforms. Each is manned by a crew of two, carries eight fully armed Marines. Stowed in vertical racks, the rafts occupy minimal space below and present little target area in flight. With a speed of 100 mph, they can be launched from carriers lying well below the horizon and can reach objectives in a relatively short time.

Below decks the interior of the giant sub is a maze of watertight compartments. At the foot of the ladder leading down from the flight deck, one finds oneself in a vast dormitory—triple-

decker steel bunks line both walls with another tier down the center. In the mess hall where troops spend their waking hours, there are pleasant colors, restaurant-style booths, shelves of books, magazines and games.

During an assault the air rafts rise to the flight deck on their elevators, are set down horizontally and readied for flight. Assault teams come up through personnel hatches and scramble aboard. As the first rafts take off, others are brought up, having been transferred from wall racks to elevators on overhead tracks. The "ready" rafts are stowed on the elevators at all times. The rafts rise from the deck in regular order and head for their objectives. Shuttling back and forth at high speed they can land 2240 Marines in seven trips. •

Elevator at flight deck level; 18. Air rafts lowered to deck; 19. Troops boarding air rafts; 20. Air rafts taking off; 21. Troop quarters; 22. Troop lounge/mess hall; 23. Lobed pressure hull; 24. Escape hatch; 25. Buoyancy tanks. Above right: Air Raft Detail Key: A. Twin engines; B. Electromagnetic oil transmission; C. Contra-rotating ducted fans; D. Small side fans for lateral control; E. Fuel tanks; F. Eye rings for hoisting; G. Life ring for flotation; H. Legs for ground and deck landings; I. Eight-man assault squad.





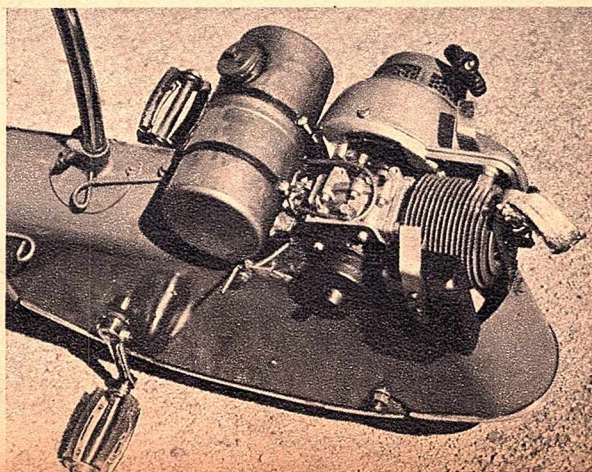
FIRST STEP in folding is to pull out pin, swing hinged front end in close to body.

INVENTOR Strode astride his Portacycle. It weighs only 48 pounds, can carry up to 300 pounds and does 30 mph plus.

Here Comes the Portacycle

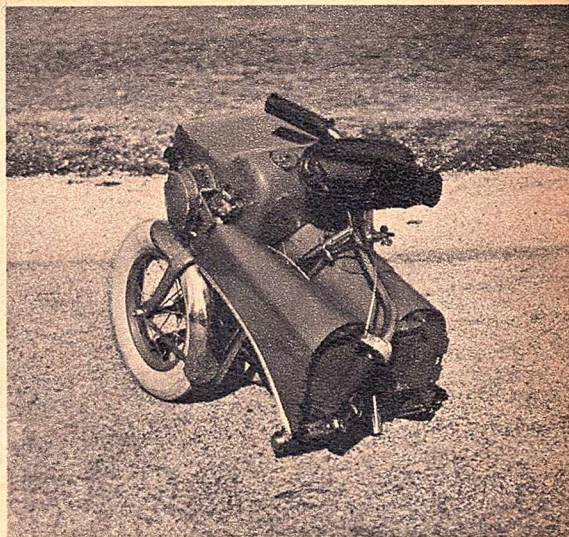
This motor scooter is a 30-mph, 100-mpg whiz that folds up into an easily carried handful.

PORTACYCLE has 1-cylinder magneto type 2½-hp motor and automatic transmission.





REMOVABLE handlebars fit tightly into body, seat folds down. Scooter is portable.



HANDY HANDFUL is toted by the handgrip on top, measures a compact 13x29x20 inches.

WHEN better Portacycles are made Hildrath Strode will build them. The unique motor scooter invented by the Huntington, Long Island mechanical engineer folds up to the size of a suitcase in a few moments. "It's the only motor scooter that is portable with the advantages of a full-size motorcycle," says Strode of his 48-pound creation.

The Portacycle buzzes along at up to 30 mph plus and will travel 100 miles on a gallon of its gas-oil fuel mixture. The compact little two-wheeler is of rugged steel, aluminum and Fiberglas aircraft-type construction. It is so simple to operate that the average person can

learn to ride it in a few minutes.

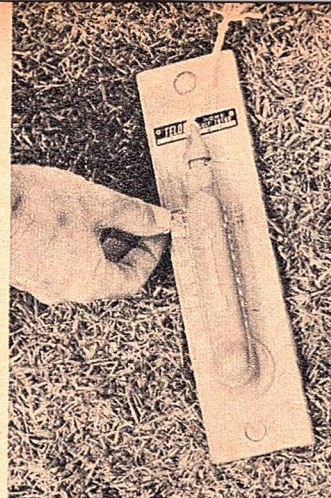
A 1-cylinder magneto type, 2½-horsepower motor with automatic transmission powers the Portacycle. A twist of the wrist and you automatically go forward. Braking is done by reversing the foot pedals. If you happen to run out of gas the Portacycle can be pedalled like a bicycle to the nearest gas station.

Strode's Portacycle is now being produced and sold for about \$325. He hopes to bring the price down to approximately \$200 as production increases. A tandem model of this jaunty fold-up piece of transportation is also in the works. •

SCOOTER is easily hefted by woman and can be stored in car's trunk or in a locker.

TIGHT SQUEEZE offers no problem for the maneuverable scooter's 3-foot wheelbase.

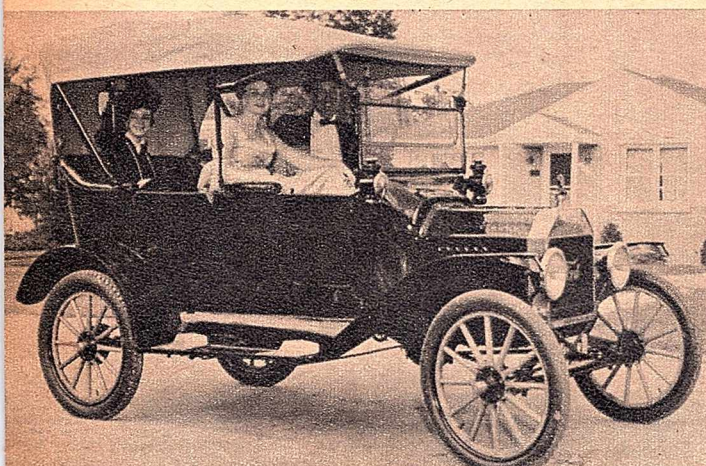




AUSSIE PRO Billy McWilliam drives three feet off tee (left). Above, he adjusts yardage indicator, lines up ball with indicator before knocking a long drive.

NEW GOLF GADGET

NEWEST driving practice gadget for golfers is the invention of a Sydney, Australia engineer, Mark Burnett, who started work on it after his first game of golf. It consists of a golf ball on a nylon line attached to a spring inside a metal casting that pegs into the ground. Distance up to 300 yards is recorded and gadget swivels to show hook or slice. •

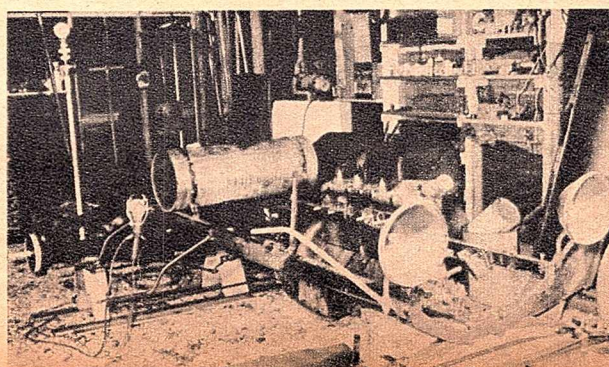


41-YEAR-OLD FORD

McELROYS step out in their 16T Ford. Restoration cost \$1,300.

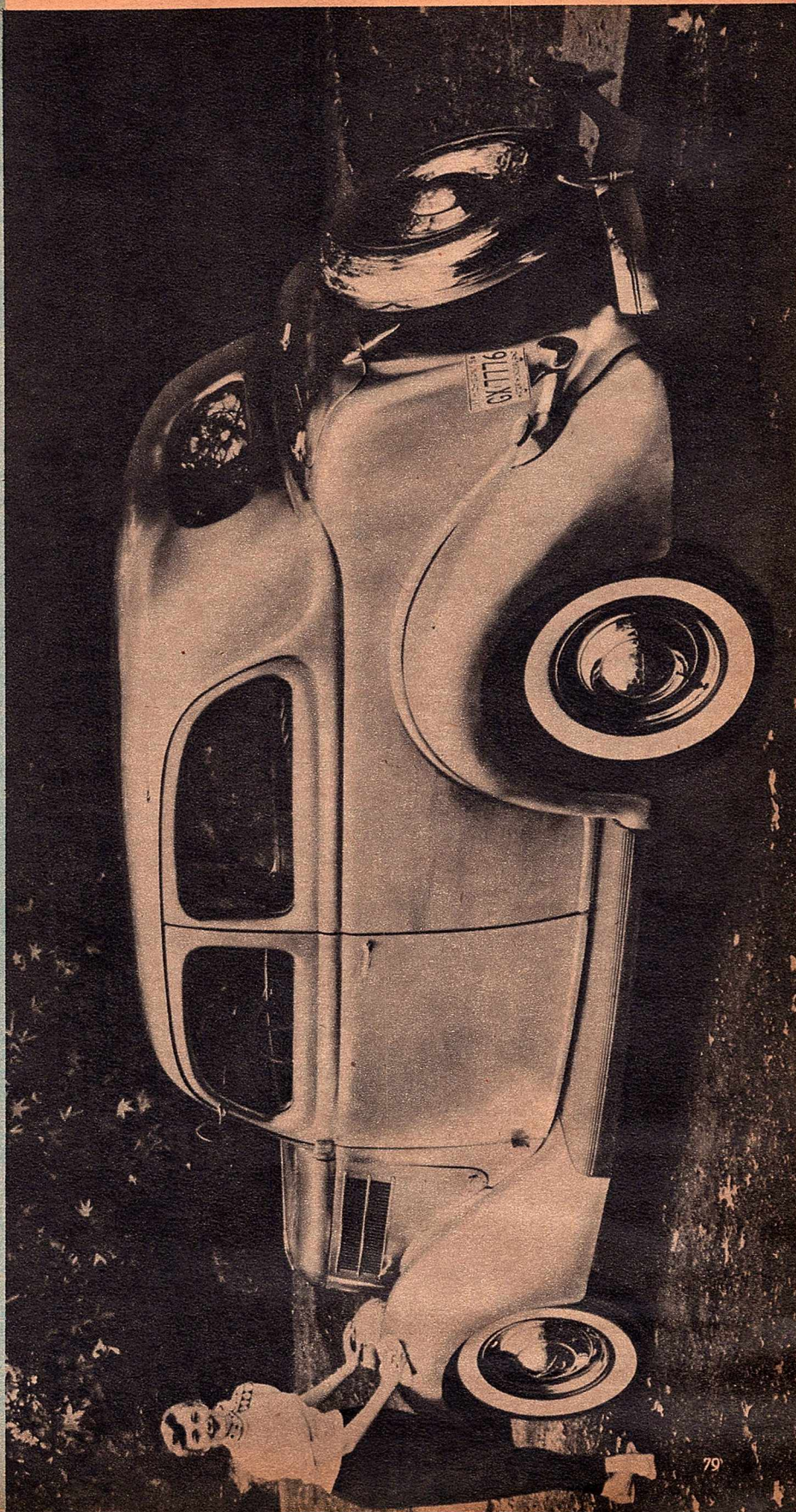
SKELETON on which McElroy lovingly rebuilt his antique.

THE original price of the 1916 Model T shown above was \$360; restoring it cost Model T enthusiast E. L. McElroy, Westchester, Ill., \$1,300 and countless hours at work in his garage. Car has a 42 mph top, gets 15-20 mpg, runs like a railroadman's watch. •



Eye-Stopper

STAINLESS STEEL AUTO built almost 21 years ago is about the same age as shapeless Kay Andrews, secretary in the Detroit office of a steel company. The car was constructed to demonstrate the enduring qualities of stainless steel. One of six made at the time, the shining example has traveled over a quarter of a million miles and worn out three engines. The body still gleams but the car no longer hits the road.



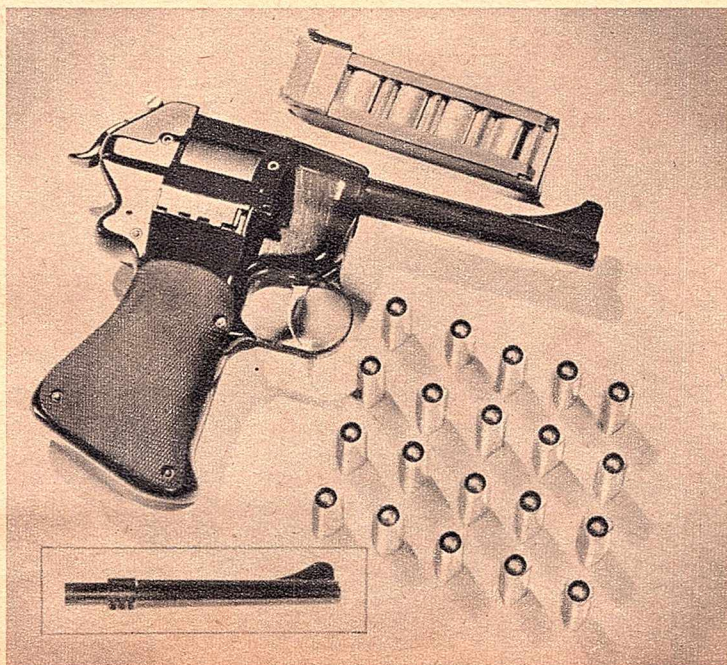
THIS GUN

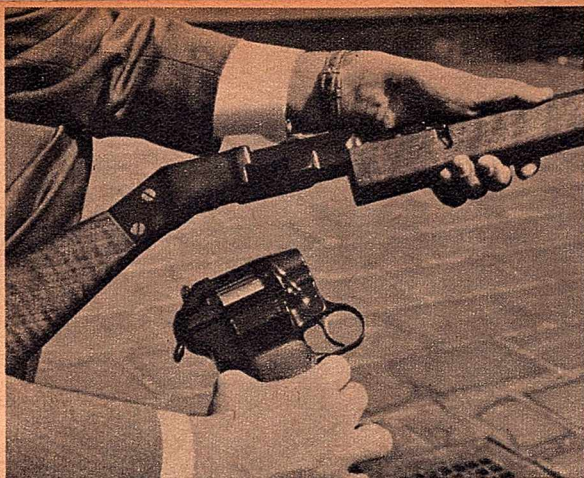
*Fires Triangular Cartridges!
Is a 20-Shot Revolver!
Can Be Loaded While Firing!
Comes With Two Barrel Sizes!
Can Be Converted To a Rifle!*



THE revolutionary new Dardick open chamber revolver is as versatile as a six-armed monkey. It comes with two different sized barrels, converts from a pistol to a rifle, fires 20 triangular cartridges, ejects fired cases and can be loaded while firing. The double-action, semi-automatic gun uses the special .38 or .22 Dardick cartridge or, with a simple adapter, any standard ammunition. Open chamber ejection makes it possible to build lighter and faster firing weapons that are more reliable at less cost than standard guns. •

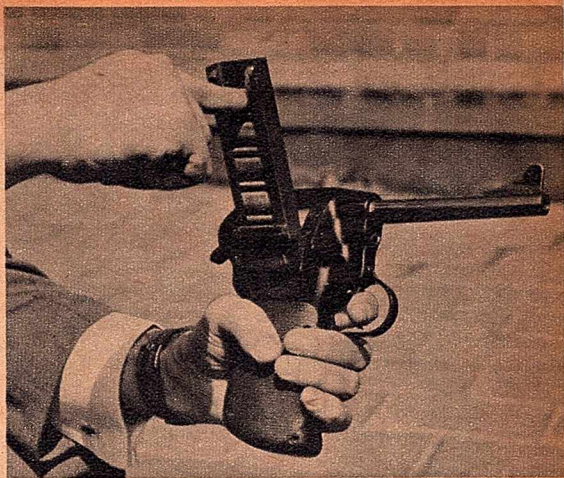
.38 DARDICK SPECIAL comes with an extra .22 barrel, 20 rounds of ammunition and a clip. As yet, no retail price has been announced for this unique gun.





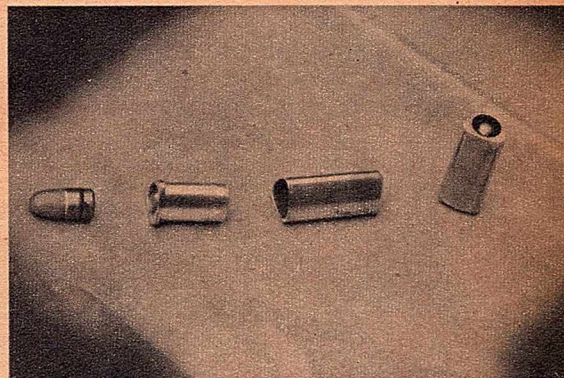
QUICK CHANGE converts pistol into rifle. Armed forces are interested in gun design.

RIFLE-STOCK components conform with the rigid firearm regulations of government.

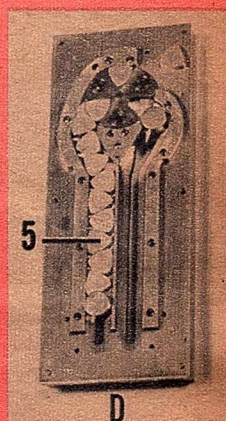
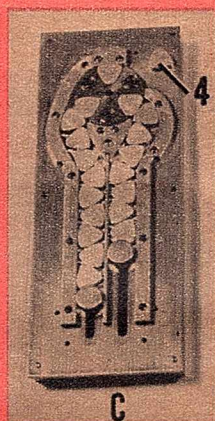
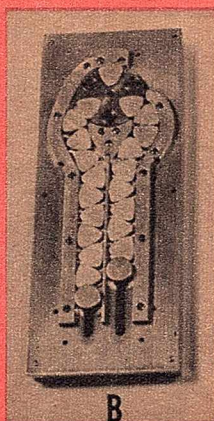
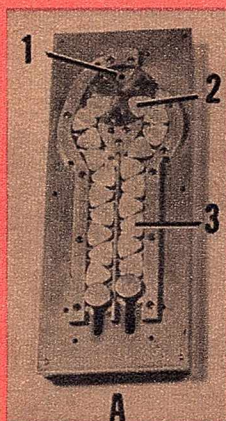


LOADING is done by inserting clip on both sides, pressing shells into grip magazine.

TRIANGULAR telescoped cases house the conventional bullet fired from the weapon.



CROSS SECTION of firing mechanism. A. Gun is fully loaded on both sides of the grip magazine. Trigger has been pulled once. Firing position (1) is still open. Shells (2) are feeding from right side (3). B. At second pull of trigger, chamber rotates to fire gun and pick up another round. C. At next pull of trigger empty shell is ejected (4) and next round is fired. D. When right side is emptied, gun feeds from left side (5).





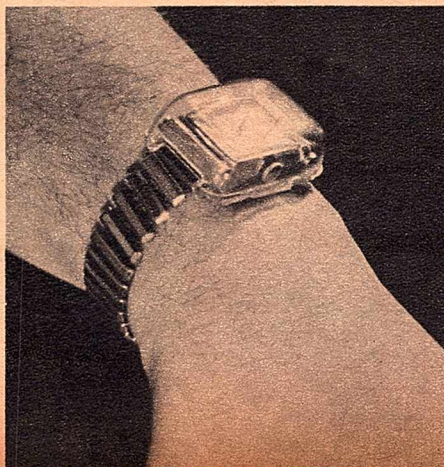
IT'S NEW!

GANG'S ALL ABOARD the Flying Saucer, world's largest motorboat which takes 125 tourists for an hour's ride at Ocean City, N. J. The craft skims over waves at 90 mph.

DRIVE-IN PHONE at car-window level is one of three experimental dialers in Chicago. Weatherproof and lighted at night, phones are boon to motorists in sloppy weather.

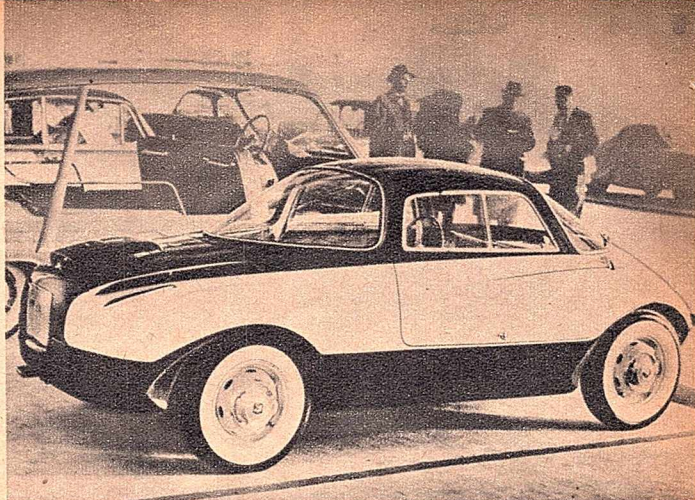


WRIST WATCHDOG snaps on easily, protects face and crystal of timepiece when wearer is working. Jerome Mietchen, Ogden, Utah, invented the sturdy little plastic device.

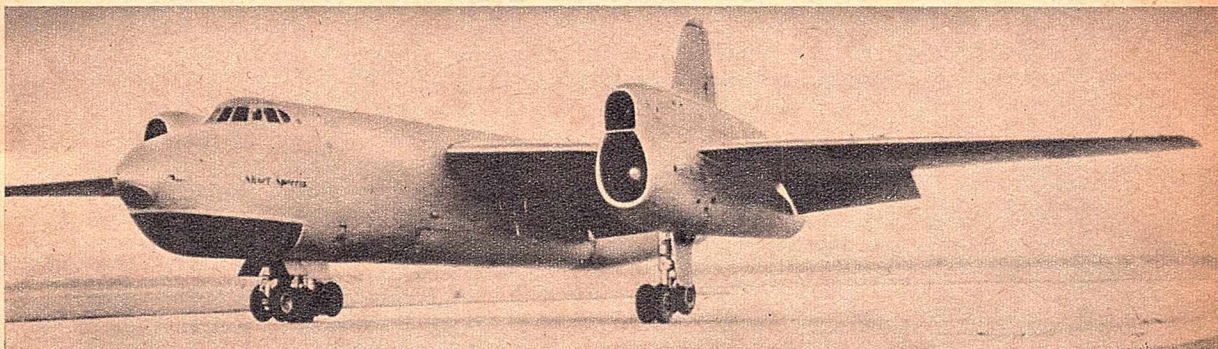




BABE IN CAR gets directions from London cabbie. Tiny English vehicle designed for youngsters is all-electric, has forward and reverse gear and does a snappy 6 mph.



RACY rear-engined sports coupe designed by Italian stylist Giovanni Michelotti has coachwork by Vignale and an Abarth Fiat 750 chassis. The car's doors open upwards.

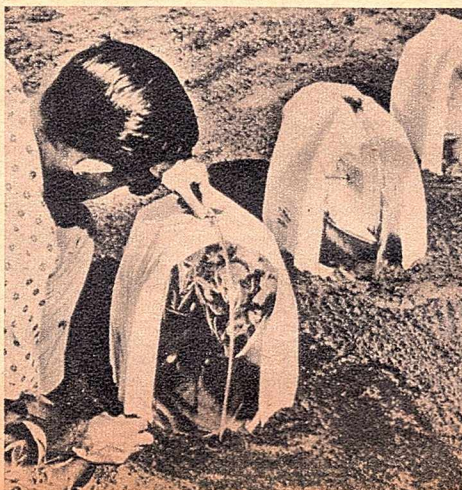


ALL-POWERFUL new Gyron turbo-jet engines on this DeHavilland craft are said to be most powerful in world with 20,000-pound thrust. They're designed for 1,000 to 2,000-mph speeds.

PRACTICAL PROSPECTOR uses a new Ronka portable electromagnetometer receiver unit to hunt for lead, zinc and copper up in northern Canada.



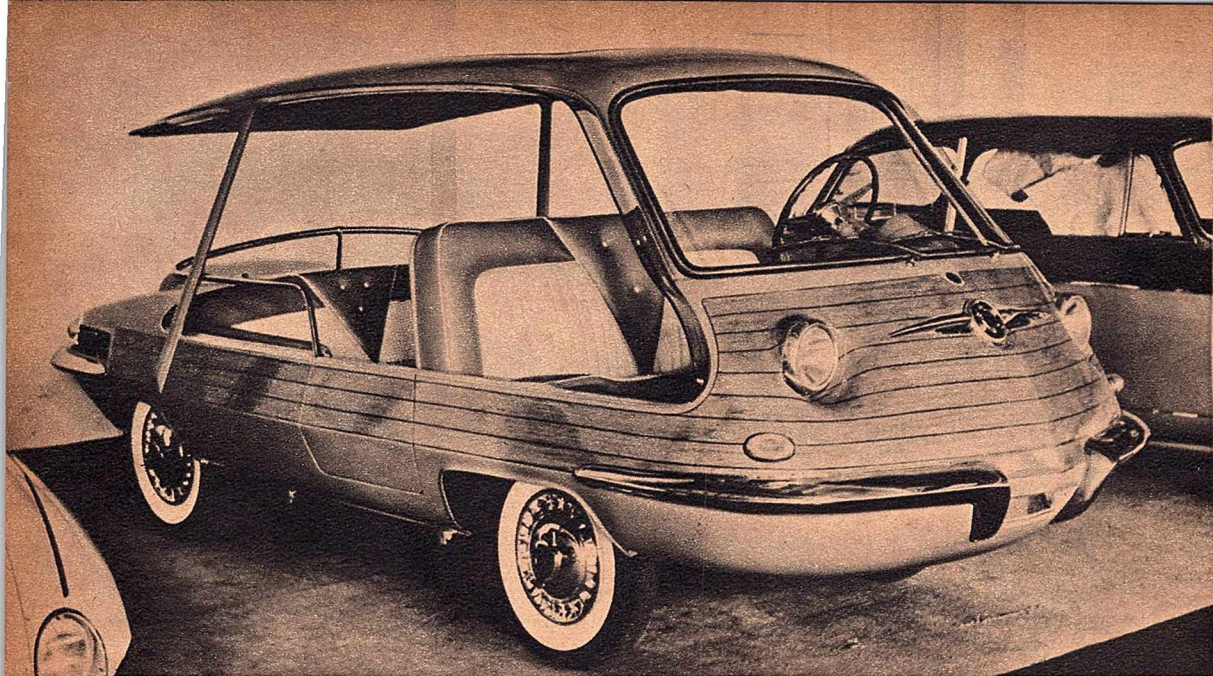
PLANT HELMETS of plastic protect young sprouts from driving winds, rain, light frost, bright sunlight. Aldon Products Co., Duncannon, Pa., makes bonnets.



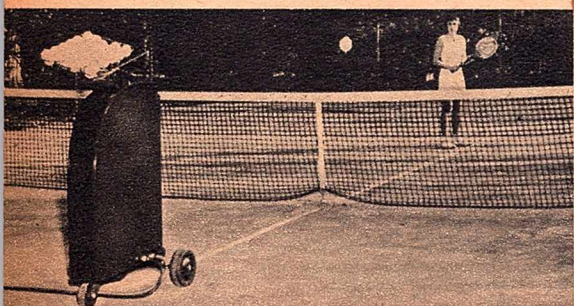
DANCING DOLL is controlled via radio in girl's hands. Receiver, electric motor and battery are located under the German doll's tiny skirts.



CONTINUED...



BEACH BUGGY with the jaunty look is for vacation fun, another design by the imaginative Giovanni Michelotti. It is Vignale-built on Fiat Multipla chassis.



TENNIS, ANYONE? Ball Boy machine holds up to 40 balls, fires them over net with pinpoint accuracy at five-second intervals and at desired speed to help improve game.

DOG COTTAGE transports tiny chihuahua from kennel-to-kennel when she competes for top honors in English dogdom. The lady's snootful name is Dalhabboch Emima-Maud.



FRIGOMAT cools liquid as it is pumped from bottle into glass. The plastic German device fits any type beverage bottle. It was unveiled at Frankfurt International Fair.





RAIN CURTAIN on plastic umbrella invented by E. Parmenter, Capetown, So. Africa, has strings to raise, lower it at New York Gadget Show.

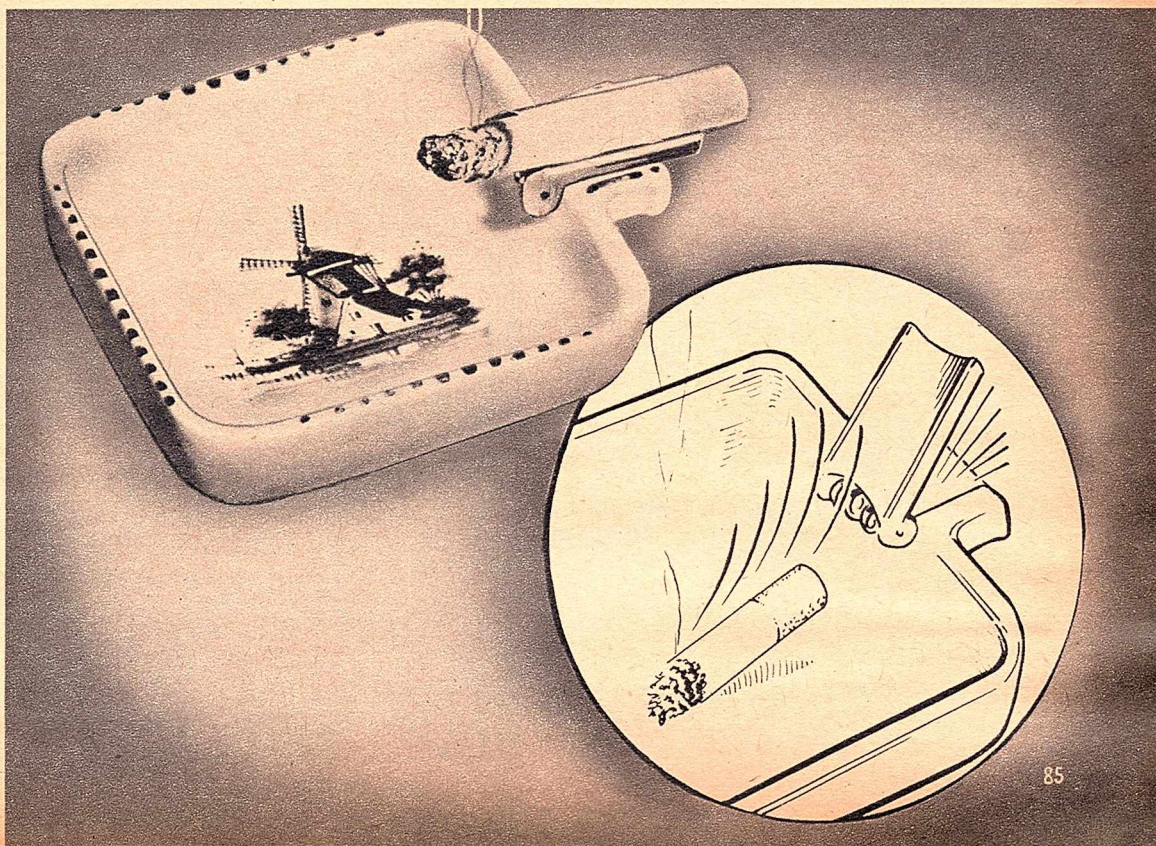


SELF-HEATING coffee pot serves up to 200 cups per can, operates five to 12 hours on built-in burner. Keith Christen, Monroe, Wis., invented the device.



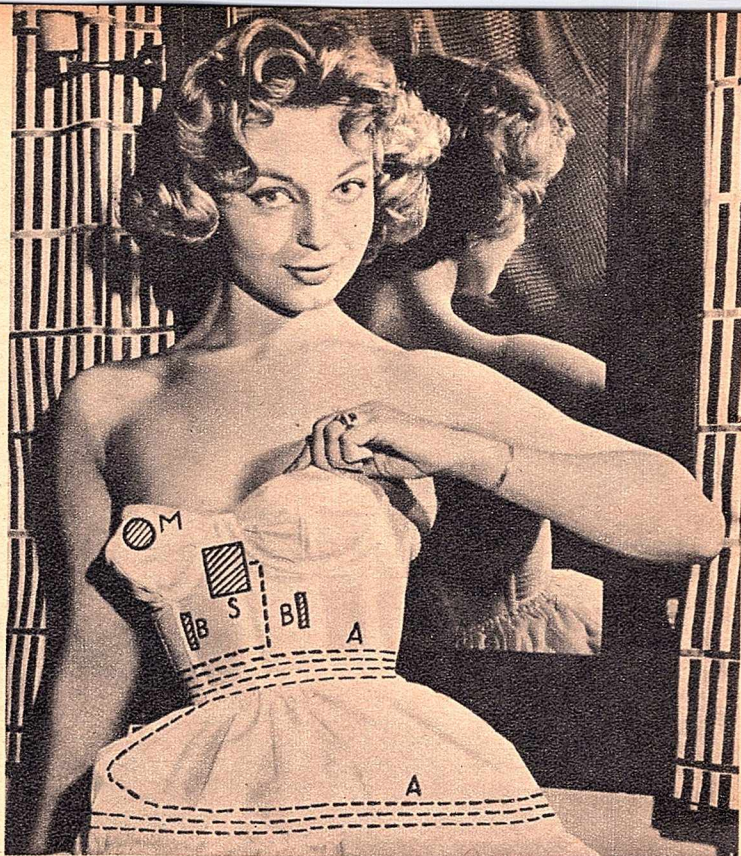
SAD BASSET demonstrates new resuscitator-anesthetizer developed by medical engineers which will decrease risk in operations on pets.

BUTTS left in Delft ash tray chute automatically drop into tray when the heat-sensitive spring tilts. Imported by Mellinger Co., Los Angeles, Calif.



Electronic Mata Haris

Watch out for that girl, laddie; you might be talking over her head but into her microphone.



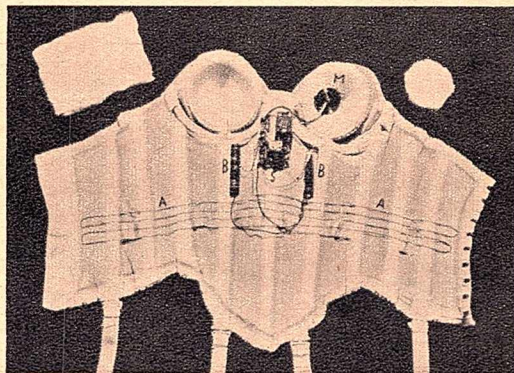
AS Willie Shakespeare once said, "There's more to this than meets the eye!" This, in the present case, happens to be the bodice of a Sweet Young Thing, said bodice containing microphone, batteries, antenna and transmitter—constituting a miniature radio station with a range of 200-300 feet.

The West German device is but one of several now being used in industrial espionage—the art of swiping your competitor's business secrets without his knowing. It works like this:

Sweet Young Thing has date with two scientists from Firm A. Mike concealed in the bosom of her party dress picks up their shop talk and other bodice equipment transmits it to operative of Firm B waiting outside in a car equipped with tape recorder. Sweet Young Thing gets paid off by Firm B.

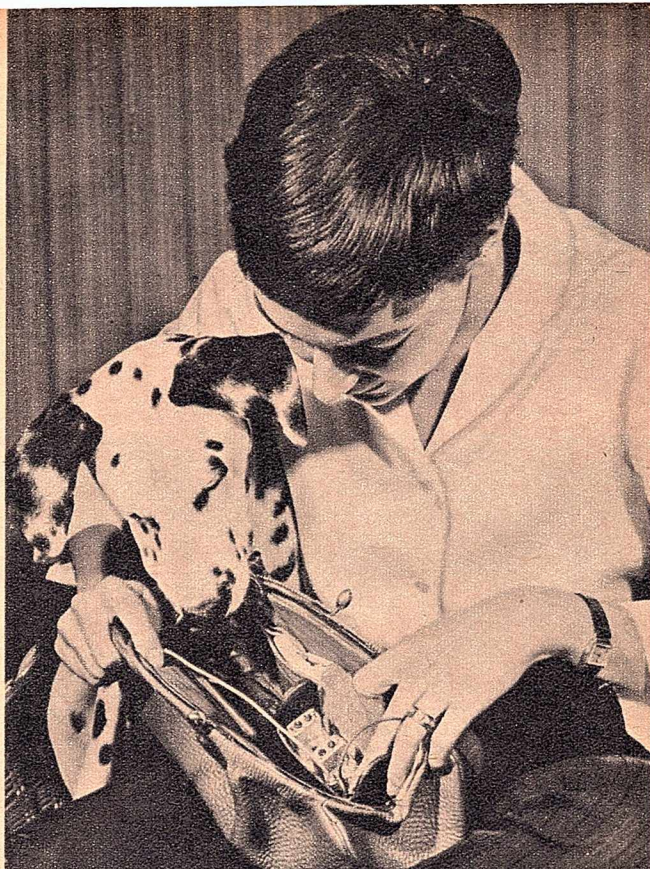
We realize that all's fair in love and war but isn't this going too far? •

SPY'S LAUNDRY now includes: A—antenna; B—batteries; M—microphone; S—sender. Below: a sly peek inside the chassis.



HIDDEN MIKE picks up careless talk. Circle indicates location.

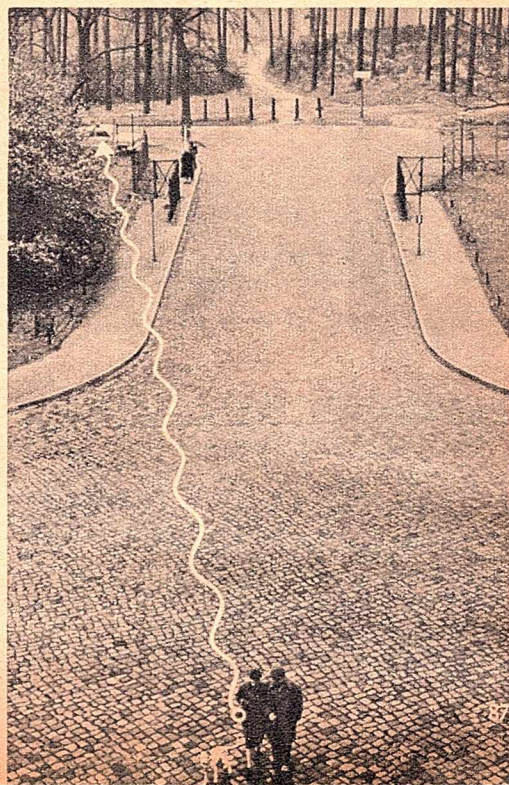
OUTDOOR SET that sends over half a mile fits in handbag, consists of three transistors, two tubes, two batteries, mike, transmitter. Dalmatian is part of the act.



ANTENNA-LEASH hooks to metal frame of the handbag. To an observer this appears to be a handy but innocent device.



SPY AND DATE stroll in the park sharing little secrets with the operator of the car who follows at a discreet distance.





THE PONTIAC SAFARI

"A bargeload of lush, functional and fast," says Tom of this smart wagon.

By Tom McCahill



TOM and herd of prize Labrador retrievers. He liked comfortable, six-passenger rig.

Mail for McCahill

Uncle Tom's very popular question-and-answer column begins on page 176. Don't miss it!

THE word "Safari" may make you think of Gregory Peck, Ernest Hemingway or even, as my paper-bound dictionary says, "a caravan with camels." Believe me, the Pontiac Safari station wagon is in no way associated with the R. J. Reynolds Tobacco Company but is the hottest drag wagon made in America today.

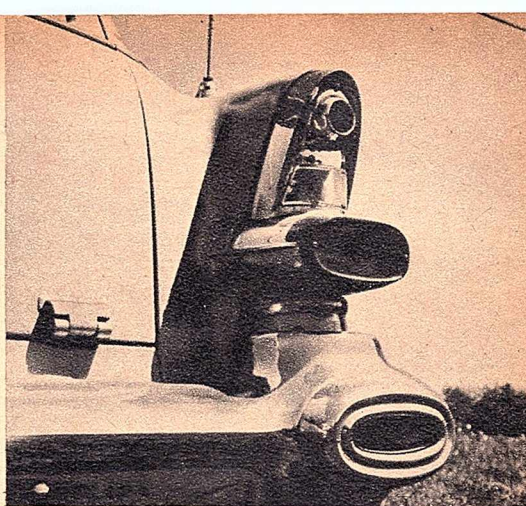
To me a safari has always meant lush

comfort on a hunt for dangerous game and the Pontiac wagon with the name "Safari" is equal to the lushest night of pleasure around the campfire with the bugs on vacation, dozens of spear-carrying natives to answer your beck and call and a brave white hunter to mix martinis while Ava Gardner only has eyes for you. That's *my* idea of a safari. Who wants an elephant anyhow? Besides, he won't fit in your deep freeze.

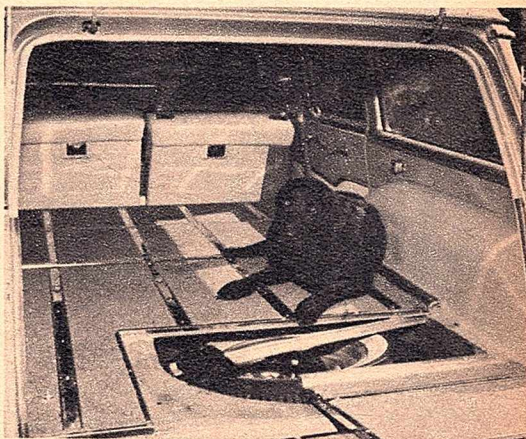
We tested the sound barrier-tickling Pontiac economy sedan a few months ago but this wagon is only distantly related to that car. My original '57 test Pontiac—which still holds most of MI's acceleration records (all but the 0-30 mph mark) and walked away with the biggest piece of the cake at the Daytona Beach Speed Trials—was the Broom Peddler's Special model. It was the Super Chief, the most hairy-chested low-priced sedan of the year, extremely long on performance but a little short in comfort. The seats were not of Sultan grade, the trunk room was stingy and the ride not too exceptional. In spite of this, its outstanding performance made it a terrific buy, far over-shadowing its minor drawbacks.

There are, however, a large number of buyers in this country, including many of our readers, who rate comfort as high, if not higher than performance. In this large group there is a tremendous station wagon class who couldn't be less interested in an out-and-out sedan. As this may be the last '57 car we will test this year (the '58s are already making

SAFARI handles nicely and is no slouch in speed department—it does a hot 110-plus.

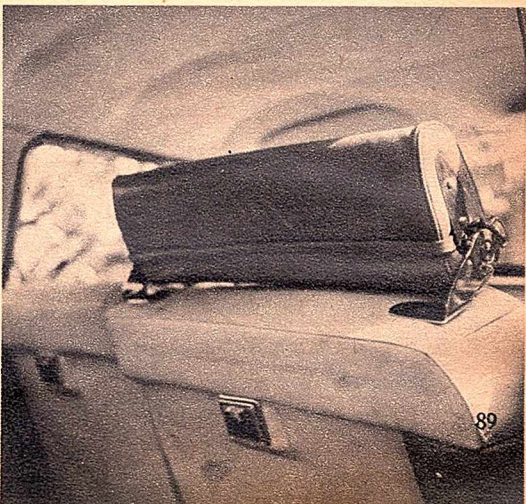


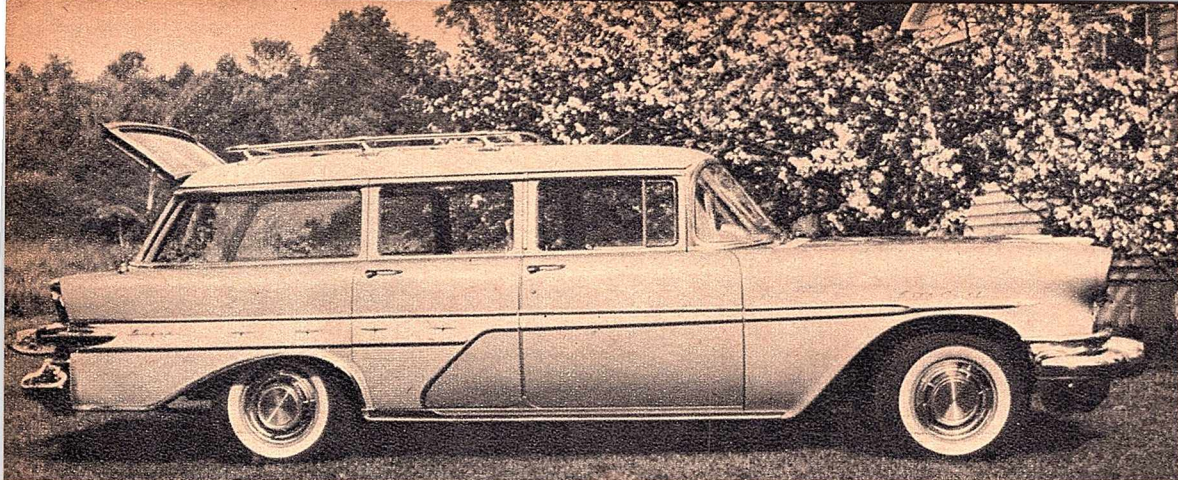
CHROME-LINED taillights and exhaust are becoming distinctive mark of the Pontiac.



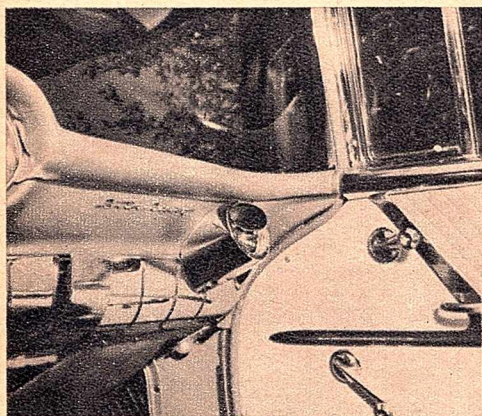
FIELD TRIAL champ Boji luxuriates in roomy cargo space. Note spare tire in the floor.

BARBER CHAIR headrest crowns front passenger seat. Upholstery is plush leather.





SWASHBUCKLE wagon is equally at home at country club as on business or camping trip.



HAPPILY CHILLED Tom liked two movable ducts on dash that air-conditioned car.

SPECIFICATIONS

MODEL TESTED:

1957 Pontiac 4-door Star Chief Safari

ENGINE:

V8 cylinder, OHV; bore 3.94 inches, stroke 3.56 inches; maximum torque 359 foot pounds @ 2800 rpm; brake horsepower 270 @ 4800 rpm; compression ratio 10 to 1

DIMENSIONS:

Wheelbase 122 inches; overall length 206.8 inches; tread 59 inches front, 59.4 rear; width 75.2 inches; height 59.3 inches; weight 3,955 pounds; standard tire size 8:50x14; gas tank 17 gals

PERFORMANCE:

0 to 30 mph, 3.6 seconds
0 to 50 mph, 6.8 seconds
0 to 60 mph, 8.9 seconds
0 to 70 mph, 11.7 seconds
Top speed, 110-plus mph

SPEEDOMETER ERROR:

At 60 mph on speedometer, actual speed 58.8 mph

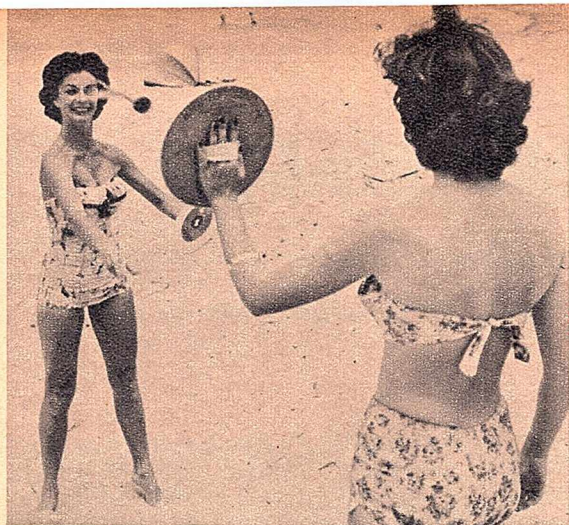
rumbles in some camps), a conference was in order.

MI Editor Bill Parker and I decided that since Pontiac had proven to be GM's outstanding surprise of the year, a deluxe version might have a lot of interest. And our station wagon set might also want to know what a wagon version of this year's bomb is like. So the choice was rather simple. The deluxe Pontiac Star Chief Safari, loaded like a Kodiak bear that has just been blasted by a cannon-full of buckshot, including air conditioning, was nominated our test car.

Unlike many of the stylized station wagons of the year, the Safari still offers ample inside roof clearance, width and folded-down floor length to make it as functional as any wagon built in the last few years. It is a comfortable six-passenger rig that doesn't feature orphan asylum advantages the way some other wagons do. The Safari is not advertised or promoted as a reform school bus for 19 sub-juvenile delinquents. I have gone on the theory for some time that a guy who had that many kids in the first place couldn't afford to pay the fuel bill for a one-cylinder Brush. This is a quality wagon for adults with a sane amount of kids; foes of Margaret Sanger can buy themselves a bus.

Let's discuss the seats first:

The leather seats on the Safari are extremely lush, quite different from our earlier '57 Pontiac test sedan's, with loads of tail support and a reclining front passenger seat with a barber chair headrest. Oddly enough, though these seats are as [Continued on page 180]



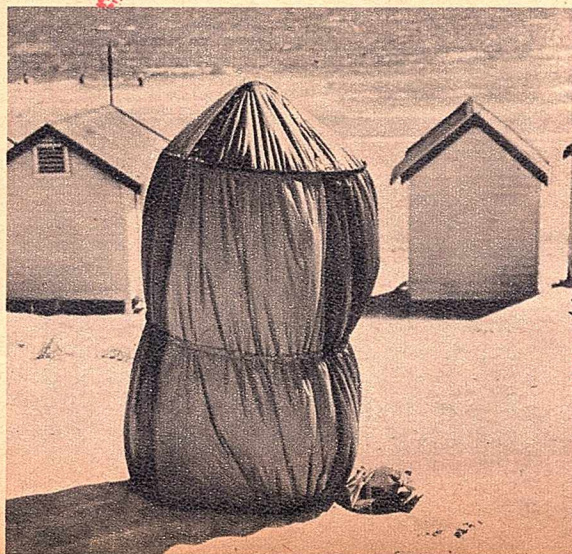
SHUTTLE DARTS is a wedding of darts and badminton or shuttlecock. Players throw and catch alternately; catcher tries to snag dart on bullseye.

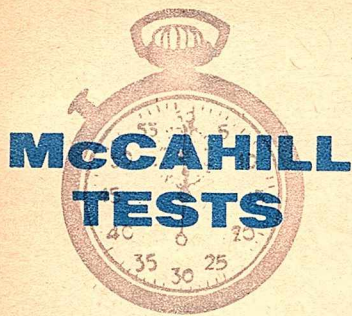


NEW FOR THE BEACH



BEACH CHANGE TENT or collapsible locker room gives a girl privacy in full view of the life guards and seaside Tarzans. Light as a beach bag, tent pulls down over head, zips shut. Below, model steps fetchingly out in her leopardskin swimsuit.

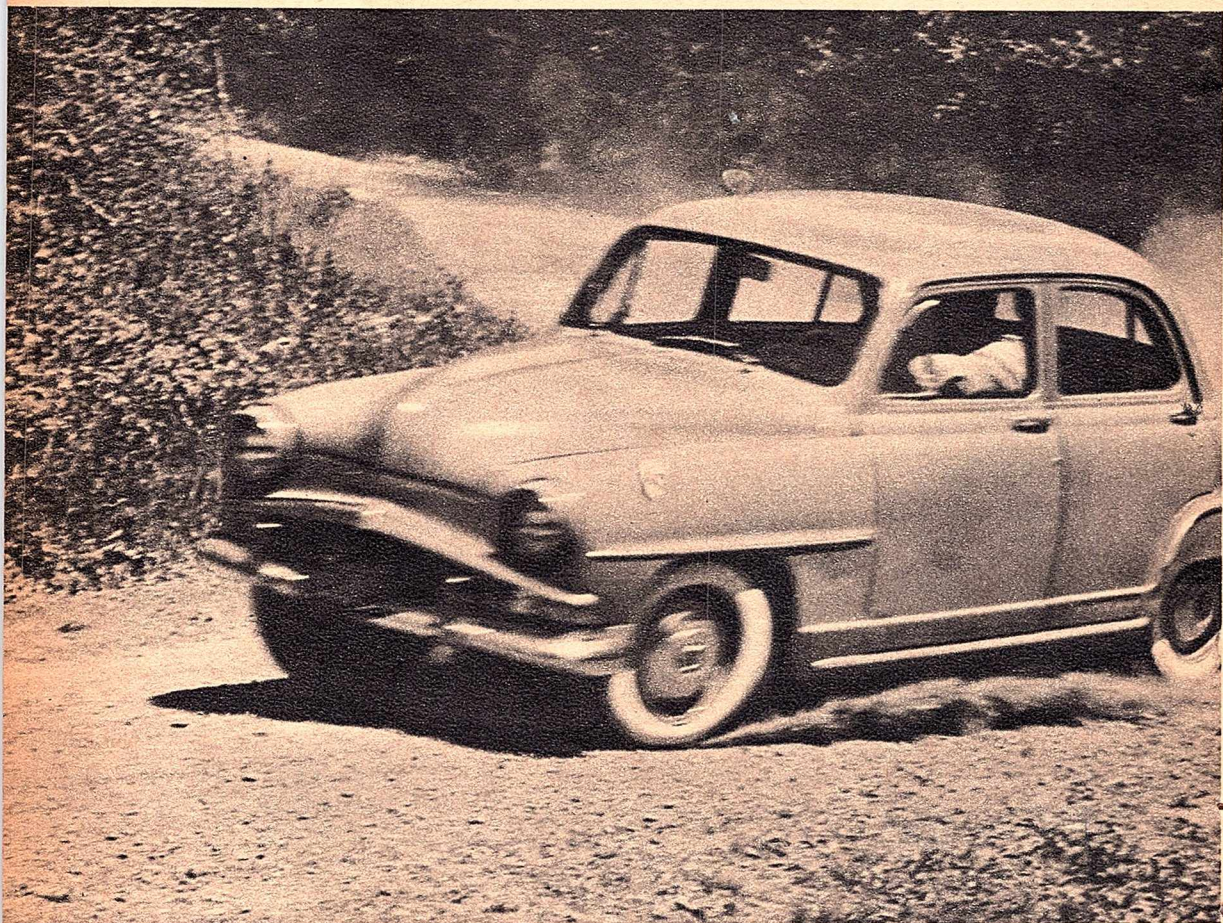




THE SIMCA

*"A definite challenge to Volkswagen"
says Tom of this small French import.*

By Tom McCahill



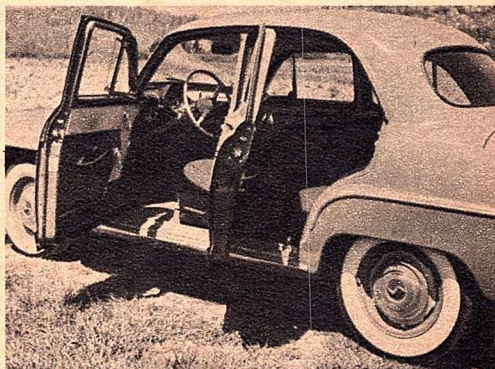
IF you dove-tailed the swallowing of a pearl oyster in France, you might just possibly come up with a definition of the Simca Aronde. Explanation: As this is a test of the Simca Aronde, the name "Aronde" piqued my curiosity. I pulled the French dictionary out of my How-To-Get-Along-With-Girls Kit and found "Aronde" could mean either "swallow," "dove-tail" or "pearl oys-

ter." *Vive la France!*

This was my first go—as they say across the channel—at a Simca in many years, though I've encountered these fine little cars on the roads of France in large enough numbers to simulate a Japanese beetle invasion. At this writing the Simca people are planning to invade these shores with some 15,000 vehicles in the next 12 months. This

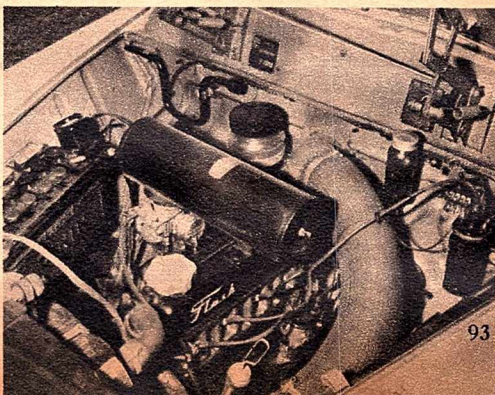
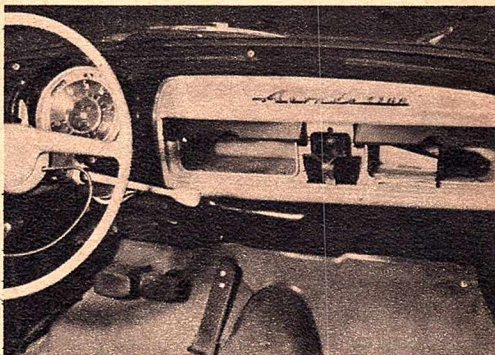
SMILING JIM McMICHAEL at work. Tom reports that trunk space on the Simca is "big for Europe, small by American standards."

"**ON HARD** turns the Simca grooves like a bowling ball going down laundry chute."



"**A COMFORTABLE** car for four more-than-average-sized people," opined Uncle Tom.

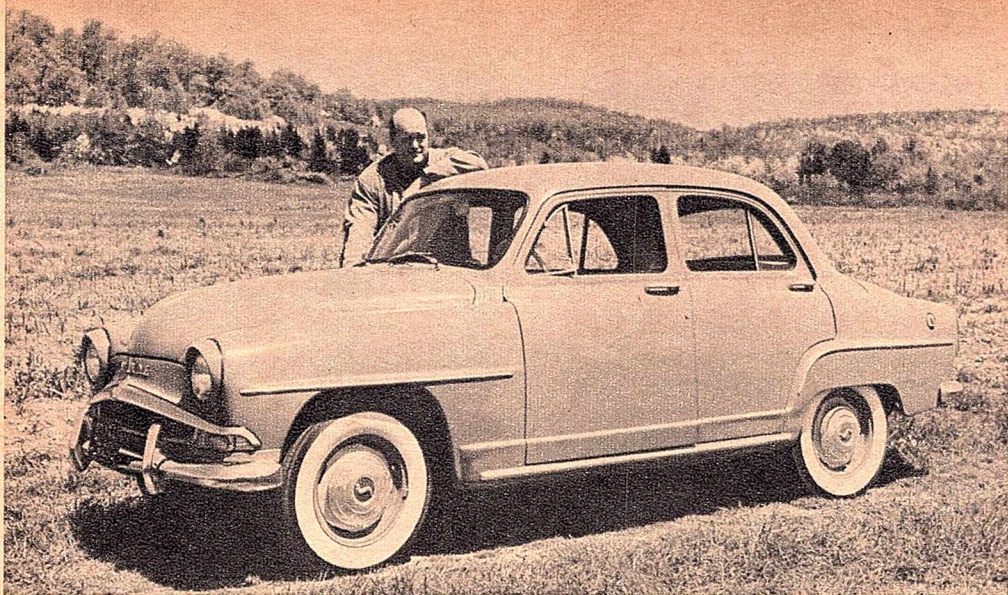
DRIVER leg room is slightly short by foreign standards. Glove compartment is large.



is hardly a drop in the bucket when compared with the Volkswagen market or the production schedules for America now under way in Italy's great Fiat plant. But it's a start.

France, one of the original hubs of the automotive industry, has been making excellent cars for years but somehow they were poorly merchandised

LITTLE four-cylinder engine's torque in all four gears pleasantly surprised Tom.



SIMCA'S looks impressed Tom as a good compromise of Continental-American blending.

and handled on these shores. Our test car, the Simca Aronde, is a definite challenge to the German Volkswagen, even though the price tag is roughly \$200 more. Two hundred dollars is not apt to stop a man when he's out to buy a new car, providing there's that much more value in the basket. Simca's thrust at the American market will start off with the Aronde, a four-cylin-

der gem, and will go all the way up with other models to the V8 Vedette with a starting price of \$2,000 and a sports convertible selling for \$2,900. There will also be a station wagon which looks like a station wagon and not a delivery truck.

My first impression of the Aronde was that it had good compromise Continental-American looks. My second impression came when I slid behind the wheel. This is a much better-looking car from the outside than from the inside. The interior reminded me of a pre-World War II Chevrolet—as chic as wearing tennis sneakers with an evening gown. The test car was a four-door with surprising back-seat room. Though the driver leg room was slightly short by foreign standards, it had as much of it actually as an American Cadillac.

It has more shoulder room for the driver than the VW and to be absolutely fair, it is quite a comfortable car for four more-than-average-sized people. The trunk space, big for Europe, small by American standards, was large enough to pack in McMichael and his folding banjo without too much effort. Let's face it—in baggage and passenger room the Simca has the VW whipped to the post.

The biggest surprise came to me when I started off and went through the Simca's smooth [Continued on page 181]

SPECIFICATIONS

MODEL TESTED:

1957 Simca Aronde

ENGINE:

4 cylinder, OHV; bore 74mm, stroke 75mm; maximum torque 65 foot pounds @ 2800 rpm; brake horsepower 57 @ 5200 rpm; compression ratio 7.8 to 1

DIMENSIONS:

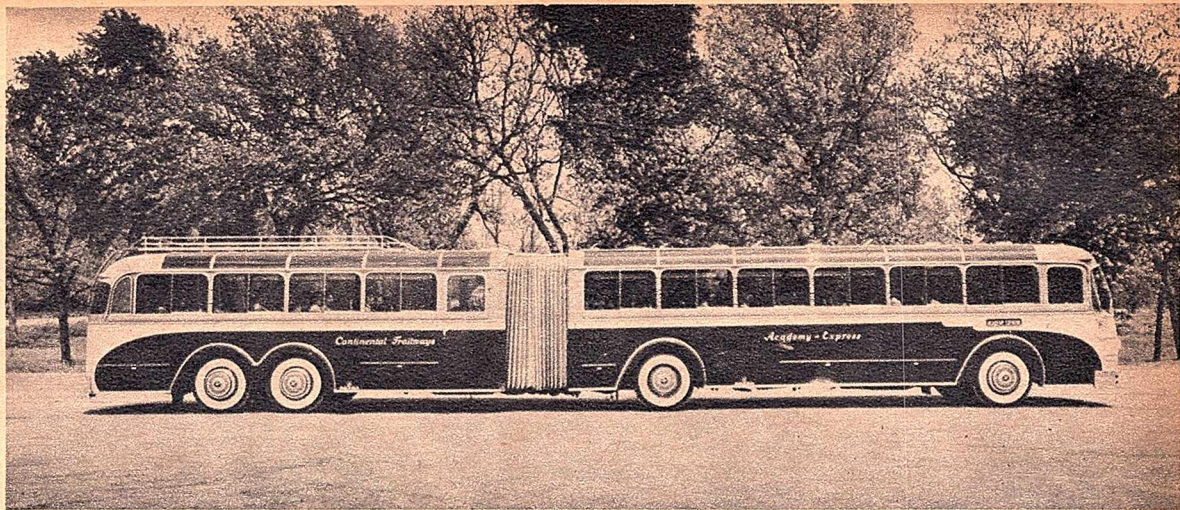
Wheelbase 96 inches; overall length 162 inches; tread 49.3 inches front, 49.2 rear; width 61.2 inches; height 60 inches; weight 2,050 pounds; standard tire size 5.60x14; gas tank 11 gals

PERFORMANCE:

0 to 30 mph, 6.4 seconds
0 to 50 mph, 15.1 seconds
0 to 60 mph, 20.2 seconds
Top speed, 80 mph plus

SPEEDOMETER ERROR:

At 60 mph on speedometer, actual speed 57.7 mph



SIXTY-FOOT BUS needs less room to turn than regular 35-foot type.

BENDABLE BUS IS B...I...G!

New accordion-pleated bus provides lush comfort, hostess service and free lunch.

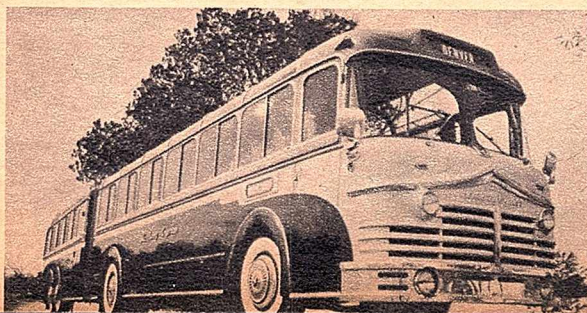


OLD travelers over the Denver-Pueblo bus route are in for a big surprise on their next trip unless they've been reading about Continental Trailways' new German coaches that bend in the middle, offer free refreshments, a rolling rest room, music and hostess service. Typical of the luxury coaches of Europe, the buses open a new era in bus travel in this country. •

HOSTESS serves free snacks to passengers from compact galley located amidships.

LOTS OF GLASS means lots of view and lots of light and a happy-looking interior.

LIGHTWEIGHT steel-aluminum coach uses an American-built Cummins Diesel engine.





David LaChapelle

So You Think THIS Is Hot?

Mercury soaring? Sweat glands in an uproar?

Here are some hot tips on how to keep cool.

By Lawrence Sanders

A BUNCH of the boys were whooping it up in a Washington, D. C. lab the other day and succeeded in producing a temperature of over 1,000,000° F by the fusion of deuterium gas with an electromagnetic force in a quartz shock tube.

And a few weeks earlier high-temperature researchers at the University of Chicago used a water-stabilized electric arc to produce a reading of 25,660° F, about twice that of the sun's surface.

And Air Force volunteers, clad in union suits and socks, recently stepped into a hot air chamber and stayed in a temperature of 240° F for a period of 26 minutes—long enough to produce an edible club steak, well-done.

And here it is mid-summer 1957, and all over this sweltering land of ours cub reporters are frying eggs on sidewalks, chili parlors are going bankrupt and sweat glands are jes' a-snappin' and a-poppin' like Rice Krispies.

Say, friend, tell the truth now—is it hot enough for you?

It won't make you feel one degree cooler but you should know that on the afternoon of September 13, 1922, in the village of Azizia in northwest Libya, the mercury hit 136.4° F—the world's record. About the same time one Sheik El Swetir was ridden out of town on a palm rail for repeatedly singing 'There'll Be A Hot Time In The Old Town Tonight'.

In the U. S., Inyo County in California holds the record. It hit 134° F there on July 10, 1934. Hottest place in the world in terms of average temperature is the Red Sea port of Massawa in Eritrea. Average annual temperature (both day and night): 86°. In the U. S. that distinction goes to Key West, Fla. with an average of 76.6°.

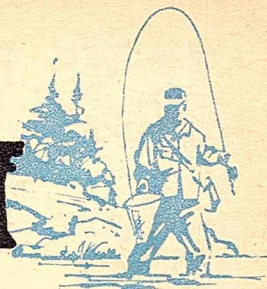
All the above readings are given as

F—or Fahrenheit. Those with a smattering of German might think Fahrenheit means "limits of heat." A smattering is not enough. The Fahrenheit thermometer is named after its inventor, Gabriel Daniel Fahrenheit (1686-1736). He was a German instrument maker who lived in Holland and came up with the gimmick of putting mercury in a tube thermometer in 1714. Previous to that, alcohol had been used—not too successfully. And previous to that, air thermometers were the thing. Even Galileo had one—but you remember what happened to him.

Fahrenheit isn't the only scale in use today, of course. Centigrade measurement is much more popular in Europe. In Germany, housewives still use the Reaumur thermometer. And in parts of Russia the DeLisle scale is used. On the DeLisle thermometer boiling water is 0° and freezing is 150°. Thus as the weather gets colder the thermometer goes higher. Now can you understand why Ike has so much trouble with them?

Fahrenheit thermometers are okay for deciding whether or not you should cut loose from your long Johns—but mercury expanding in a glass tube is really not a very accurate way of measuring temperature change. A much more sensitive thermometer is—surprise!—the human skin. Your skin can detect a change of a thousandth of a degree and is part of a marvelous heat control system that would drive an air conditioning engineer mad with envy. Here's how it works:

There are four thermometers in the human body (figuratively, son, figuratively), two for measuring heat and two for cold. One set reacts to skin temperature; the other set is located in the hypothalamus, [Continued on page 170]



Hunting and Fishing

Best Bets for Bass



WHOPPER fished with bait casting rod and reel hit motionless plug at Reelfoot Lake, Tenn.

Moody, temperamental and cussed, this wary fighter takes know-how to catch.

By Wynn Davis

IT has always amazed me that so many anglers know so little about bass. It is also surprising to hear beginners and old-timers declare bass a most difficult fish to catch. True, bass are moody, temperamental and cussed. But the man with the know-how doesn't have too much difficulty catching them regularly. And you don't have to be an expert to catch this wary old fighter.

Your best bet for bass is, without a doubt, swim-trolling minnows. This includes everything from two-inch shiners to eight-inch suckers, depending upon the size of fish you are after and the water you fish. Bass never stop striking minnows. They do move as time of day and weather dictates. They also switch moods. These factors baffle many anglers.

By far the most productive method of minnow fishing is what I call swim-fishing. The ideal would simply be to follow a baited minnow around with your boat, keeping a tight line. Since this is impossible, the nearest approach is to troll, barely moving the boat. This keeps the minnow swimming naturally over a constantly changing bottom. Such fishing finds bass and attracts them from a distance. If you develop the delicate trolling touch necessary for such fishing you'll take bass when other fellows are getting skunked.

Tackle is not too important. You can swim-troll with fly rod, casting rod, trolling rod, spinning rod or plain old cane pole. It is always a good idea to use the proper reel for the rod fished, however. A fly reel on a casting rod, for example, doesn't put the ball over home plate. I prefer a nine-foot fly rod with medium stiff action, enough rod to handle bass bugs, a good single action fly reel and monofilament line.

For bait, I use stone cats, where legal, or chubs and suckers. All are deep feeding bait and naturally head straight for bottom where the bass are. So you don't need a sinker unless the current raises the bait. Then a split shot may do the trick. In currents faster than one-third mph, row upstream against the current just enough to maintain a natural swimming speed for the bait. Hook all minnows through the lips (both lips or they'll drown). Store them in a good minnow bucket.

River smallmouths love clear, cool water that flows none too gently over rocks, ledges and sand bars. Largemouths prefer warmer, more sluggish rivers and inhabit the backwaters and sloughs. Many brackish tidewater rivers are loaded with largemouths. However, sometimes you'll find them living alongside smallmouths in fast, cool water.

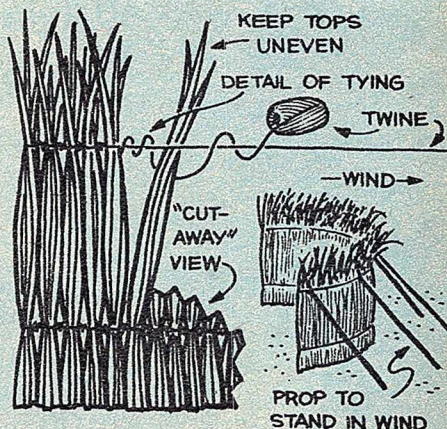
Smallmouths in lakes and ponds, like cool, clear water and rocky or sandy bottom, especially around rocky shores and clean weeds. Largemouths seek shallower lakes, warmer water and large weed beds and lily pads. Also stumps, pier [Continued on page 173]

DEADLY POPPER lures made by Dylite took these fine bass. Lure makes loud pop, goes under water, pops up again. Bass love it.

SPORTS TIPS

BY HAL SHARP

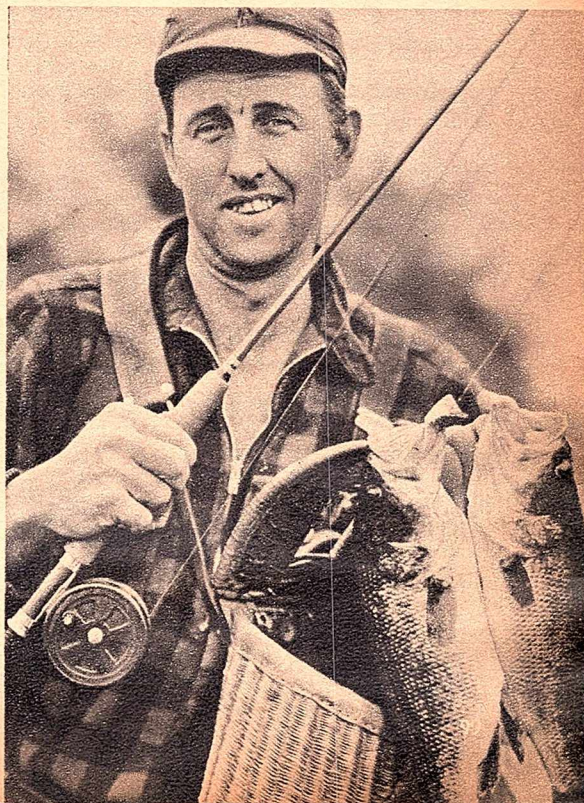
MAKE A PORTABLE DUCK BLIND OF CATTAILS



USE HEAVY TWINE TO TIE SEVERAL CATTAILS IN CLUMPS TO MAKE A STRIP ABOUT 15 FEET LONG. CUT CATTAILS OF VARIOUS LENGTHS SO THE UNEVEN TOPS PRESENT A NATURAL APPEARANCE.

STAND THE FINISHED BLIND IN A HALF CIRCLE, OPEN AGAINST THE WIND SO INCOMING DUCKS CAN'T SEE INSIDE. PROP TO STAND IF WINDS BLOW IT OVER

ROLL STRIP TO CARRY IN YOUR CAR.



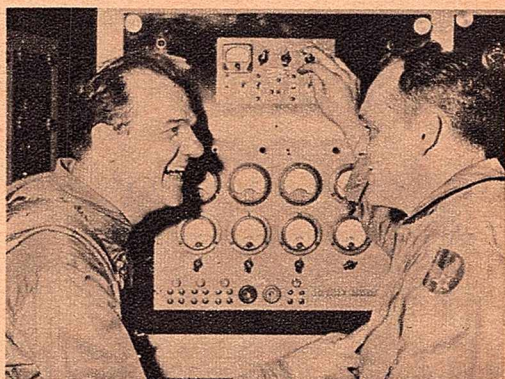
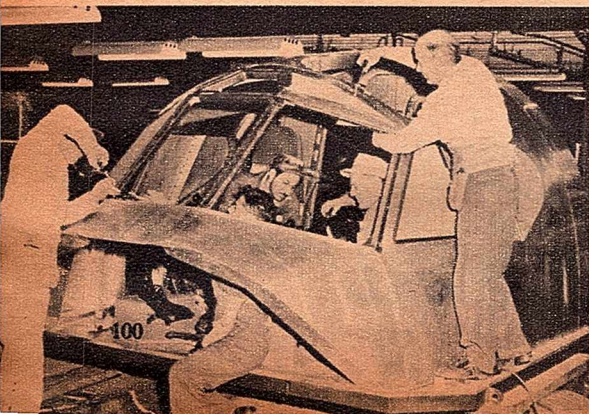


COMPLEX main and side B-52 instrument panels were built with aid of technical advisors.

BUILDING A MOVIE BOMBER

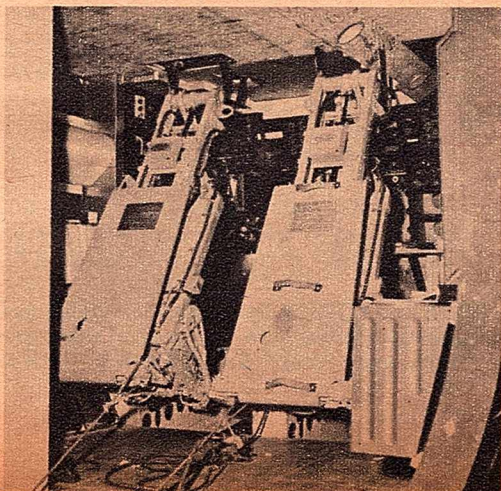
NO Sleep Till Dawn, soon-to-be released Warner Bros. movie dramatizes the importance of the Strategic Air Command as a guardian of the peace and a deterrent to war. As many shots had to be taken on the studio lot, experts from SAC were called in to help in the construction of a full-size replica of a huge B-52 cockpit section. Technical advisors from the Air Force also assisted in the mock-up of the complex instrument panels for realistic effects. •

COCKPIT section of ship was assembled in the studio by sheet metal shop craftsmen.



STAR Karl Malden and Master Sergeant James Croft who helped in building B-52.

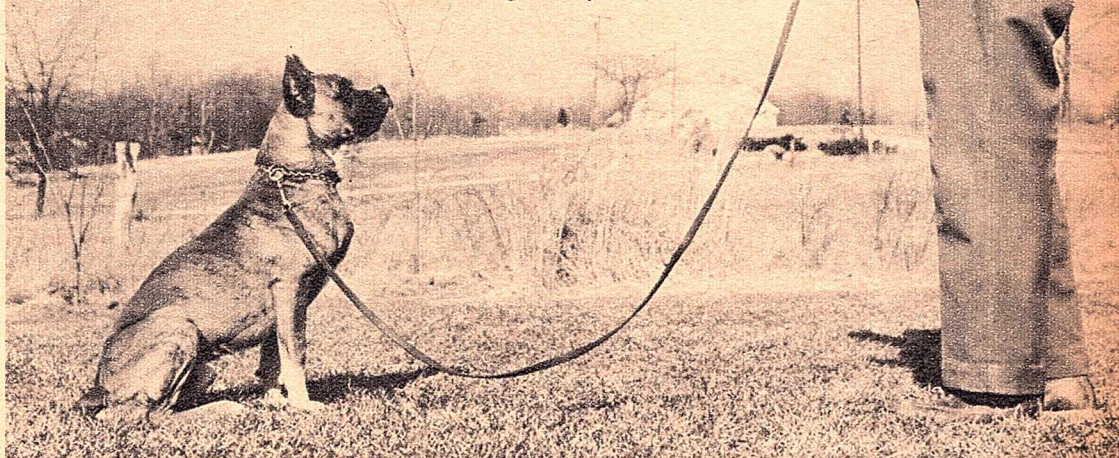
DOWNWARD ejection seats on lower flight deck are shown being placed in position.



Train Your Dog SCIENTIFICALLY

*Training a dog means training
yourself in simple psychology.*

By Bob Schwartz, Professional Trainer,
As told to George Laycock



VOICE AND GESTURE must be the same each time a command is given.

SOME dogs are a pleasure to everyone and others are nuisances even to dog lovers. The difference is in training.

We wouldn't think of letting children go without schooling. A dog needs training, too, to take his humbler place in life. You can train your dog in good behavior—and both of you will be happier if you do.

What kind of dog do you have? I don't mean what breed—I mean what personality. Here are seven types I encounter most frequently:

1. **Timid.** He's over-protected, has learned to be timid. Be gentle with this type.

2. **Shy.** He was born that way. He can be crushed by harshness and needs kid gloves.

3. **Nervous.** He's high-strung, unpredictable. He is sensitive to the feelings of those around him and needs a quiet, well-ordered family life, firm but

gentle handling.

4. **Extrovert**—"everybody's dog." He's easy to train if you can keep him home long enough.

5. **Lazy.** The English bulldog is the prototype—when someone comes to the door he goes on sleeping. Training him is a challenge as you must first arouse his interest.

6. **The Clown.** Airedales and boxers tend to this type. Instead of settling down to training they want to play all the time. Easy to train but requires extra firmness.

7. **Normal.** This is the dog that is quiet, responsive and eager to please you.

Not all dogs are interested in your approval. I had a pupil in the K-9 Corps at Fort Robinson, Neb. that bit his trainers. In our first session I didn't whip him but used my knee and jerked his choke collar. The next day, as he was going over the hurdles, he saw me

and came for me, inflicting several bites. Another trainer and I held him in the air, by collar and hind legs, until he was subdued. I continued to train him and he became a good army dog. He was a tough guy and he had to learn that I was neither cruel nor a Patsy. Another difficult dog I had recently was a German Shepherd that was unused to a collar; when I tried to walk him he would jump in the air, roll on his back and become hysterical. He had to learn the collar was nothing to fear.

But more important than understanding the dog is understanding yourself. A good trainer is calm and relaxed. He has patience and persistence. He gives each order the same way every time—same tone of voice, same gestures. He is never in a hurry. Each daily session, lasting about 20 minutes, must be gone through conscientiously and sympathetically. No hurrying through it to get to the next thing—the dog will sense that the session isn't really important to you. The good trainer keeps on with the dog until it is trained—no giving up. Are you up to this? Sure—if you're willing to change your ways a little, perhaps. Training a dog is training for you, too.

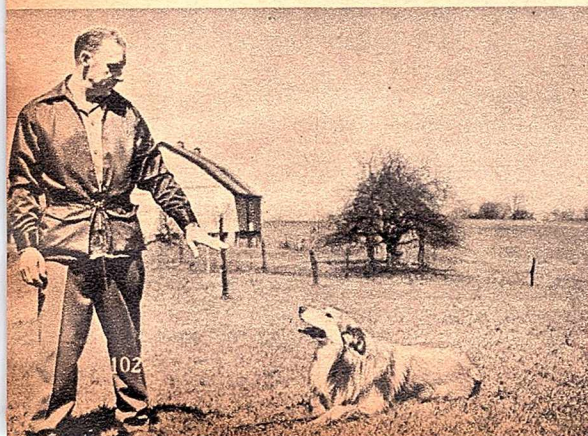
General training hints.

1. Once you've acquainted the dog with basic commands, mix up the order in which you give them to him. He must respond to each command at any time to be well trained.

2. Once you give a command see it followed—never let the dog get the idea he can get out of it.

3. Always be the same—kind, gentle,

STAY—Back away as you give command, repeating word, gesture, until he gets it.

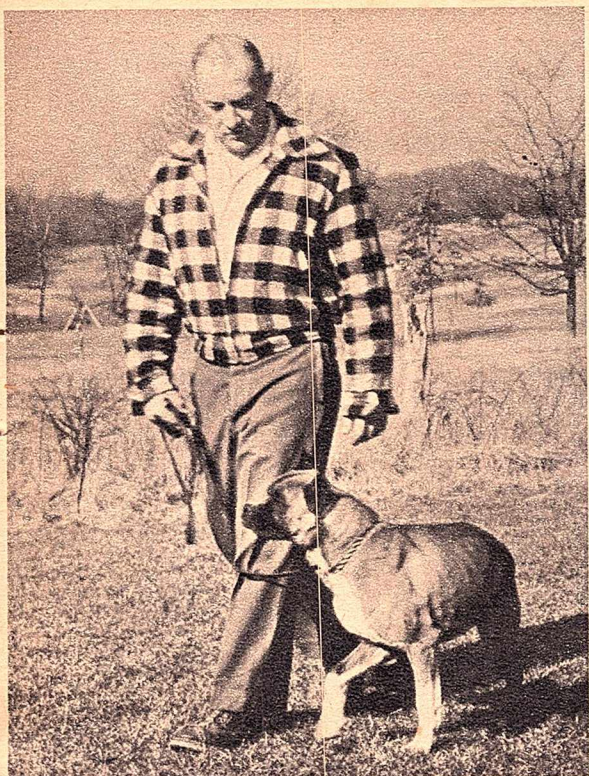


SIT—Pull up on leash, push hindquarters down as you teach the dog this command.

firm. Cruelty has no place in dog training.

The age you start training the dog depends on the dog. When he gets over being a puppy and shows a more staid, adult character, he's ready. With most dogs this happens at about one year. Before training starts he should get used to wearing a regular leather collar and if he's a house dog he must be housebroken—which does not mean permanently cowed. Remember he's a baby—his bowels and everything else about him are irregular.

For a few days tie him to his bed. Every dog needs his own bed—it's a way to keep him off furniture and a place to send him when he's naughty. The idea in tying the young dog to his bed is that he wants to keep *that* area clean and will act upset before soiling it. This is your cue to take him outside. Every time this works praise him. When he slips up, scold him and take him out again—but no punishment. With time and patience you'll housebreak him



HEEL—This is the way a trained dog walks with you. Note how trainer holds leash.

without turning him into a neurotic.

Another thing to teach the puppy is not to jump up on people—family or others. When he does it, step gently on his hind paw and say “No.” Or let him come down on your knee, saying “No” when he hits. Simple, casual discouragement will make him give it up.

There are a few basic commands every trained dog responds to readily. These are Heel, Sit, Down, Stay, and Come. They should be taught in easy stages during daily lessons.

To teach Heel, start walking with the dog on a leash with a training collar. (This should be worn only during lessons. Don't be afraid to use it—it won't choke him.) The dog should be at your left, his shoulder about even with your leg. Hold the leash in your right hand. When the dog tries to rush ahead jerk the leash across your body to bring him back to position and say “Heel!” each time you do so. After he is absolutely steady at Heel and will follow you no matter how you go, try him without the



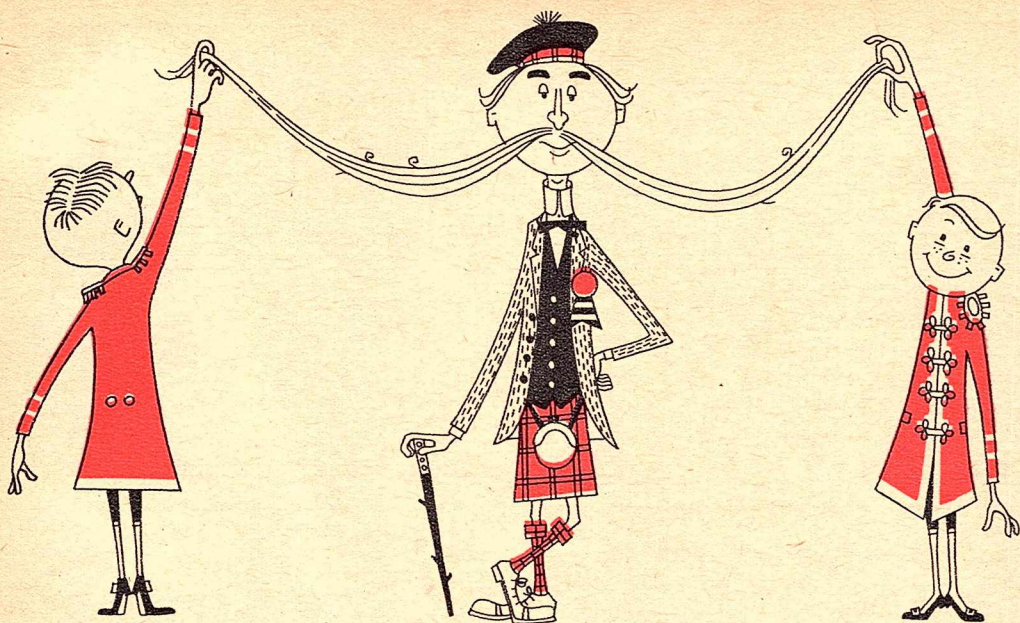
GOOD BOY—Praise must follow every order carried out; approval is his pay.

leash. A polite dog will walk at Heel without a leash.

To teach Sit, take a short grip on the leash to hold his head up and tap his hindquarters, giving the order. When he has learned this he is ready for Stay. Gradually you'll be able to back away from him, walk around him and even step over him without his moving.

Down means “lie down” and may be important to the dog's safety. With it you can make him drop in his tracks and stay until released. Using a short lead, jerk him to the ground as you repeat the command. Keep the lessons up until he obeys every time.

The most important order of all is Come. Start this by attaching a long lead (about 20 feet) to his collar. Move away and at the same time that you say “Come!” you must jerk on the lead. Be pleasant—the dog should *want* to come to you. Repeat in short daily periods. Never test a dog without the lead until he responds properly. Otherwise he may [Continued on page 190]



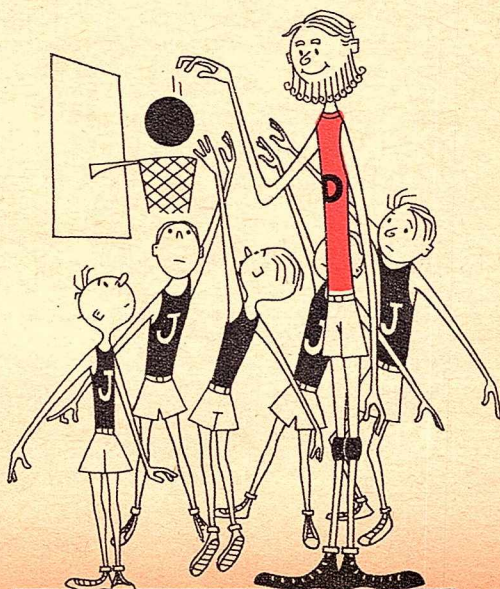
LONGEST COOKIE DUSTER of British Handlebar Club belongs to John Roy, Glasgow, spans 16¼". It may be longest in the world.

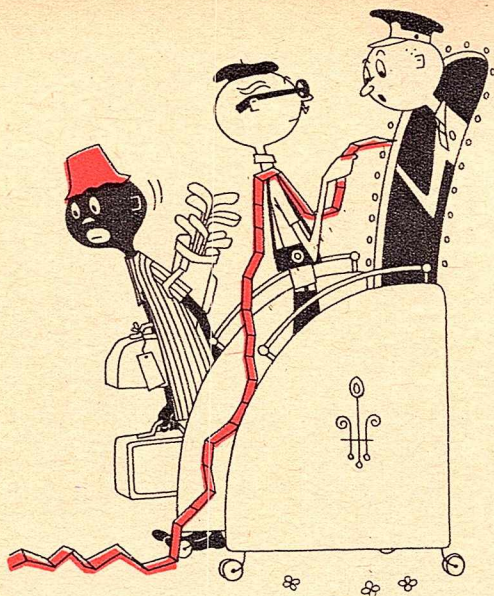
The Most of Everything

*There's a book out for people who want to know
the largest, smallest, fastest, richest,
hottest, coldest, oldest and mostest.*

FASTEST THREE-LEGGED RACE (100 yds.)
was run in Brooklyn, 1909. Time: 11 secs.

HIGHEST HOOPSTER was Tiny Reichert,
House of David center in 1936. He was 8' 11".

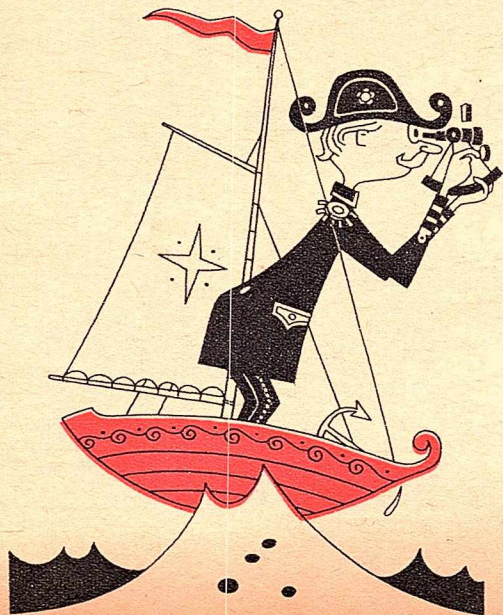




LONGEST AIR TICKET was issued by Air France in Algiers in 1955. It was 15' 3".

ARGUING about which is the mostest of anything, like the highest point in Our State or the longest bone in the human body, just seems to go with beer. Some say pretzels go better, while another body of expert opinion favors cheese and raw onions. But arguing about the mostest rates high as a diversion of malt brew enthusiasts, and that is no doubt why the ancient house of

SMALLEST BOAT to cross Atlantic made it in 55 days in 1892. She was 14' 6" long.

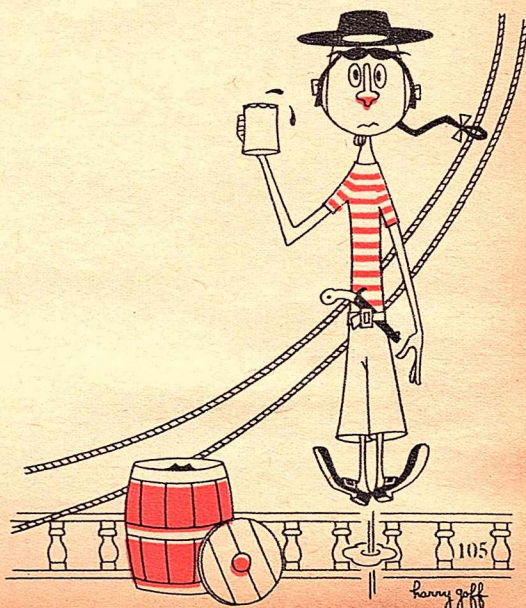


OLDEST CAT known was 33 in 1956. Her home was in Drewsteinton, Devon, Eng.

Arthur Guinness Son, Ltd., Dublin, has published The Guinness Book Of Superlatives.

The Guinness Book Of Superlatives, or GBOS, is half-humorously designed to settle arguments but in actual practice the book will be used to start fights rather than settle them. "The oldest recorded age of a horse is 62 years," you can now [Continued on page 189]

STRONGEST DRINK was pre-1948 Royal Navy rum. Alcohol content was 79.8 per cent.



Build Speedster

A Fiberglas

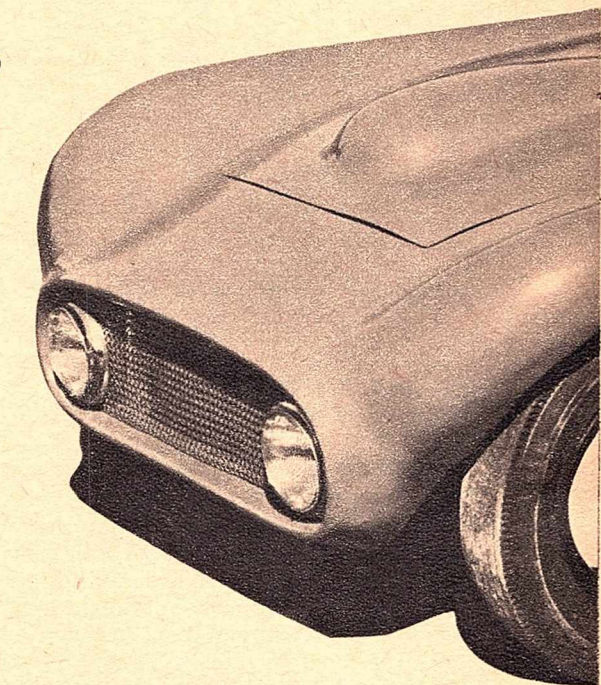
Sports Car

Hard to believe, this car was originally a 1940 Ford.

By Edward Armbruster

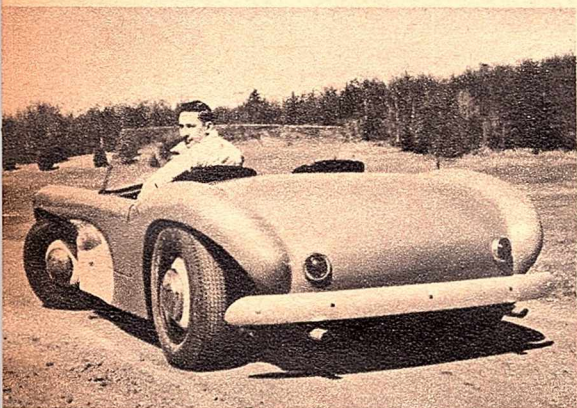
IF you are in the market for a sports car and you have plenty of moola—well, just stop at the end of this sentence. But if you are an average Joe and would like to make a buck go a long way, here's a sports car for you. For less than six hundred smackers you can have a sports car rig that stands apart from a Jag or an MG the way these cars stand apart from the common herd.

To build Speedster you will need a secondhand Willys, Henry J, Allstate, Ford, Chevrolet or Plymouth and one of the special Fiberglas bodies produced by Almquist Engineering Company of

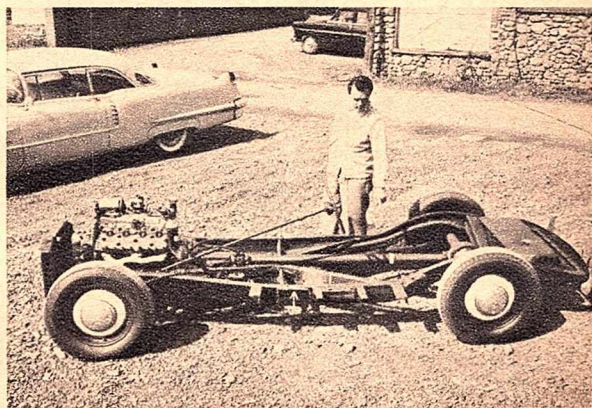


Milford, Pa. In addition to the American cars listed the body will fit many small foreign cars.

The body, which will cost you \$495, will fit any chassis designed for a 90 to 106-inch wheelbase. For this particular conversion we chose a 1940 Ford which

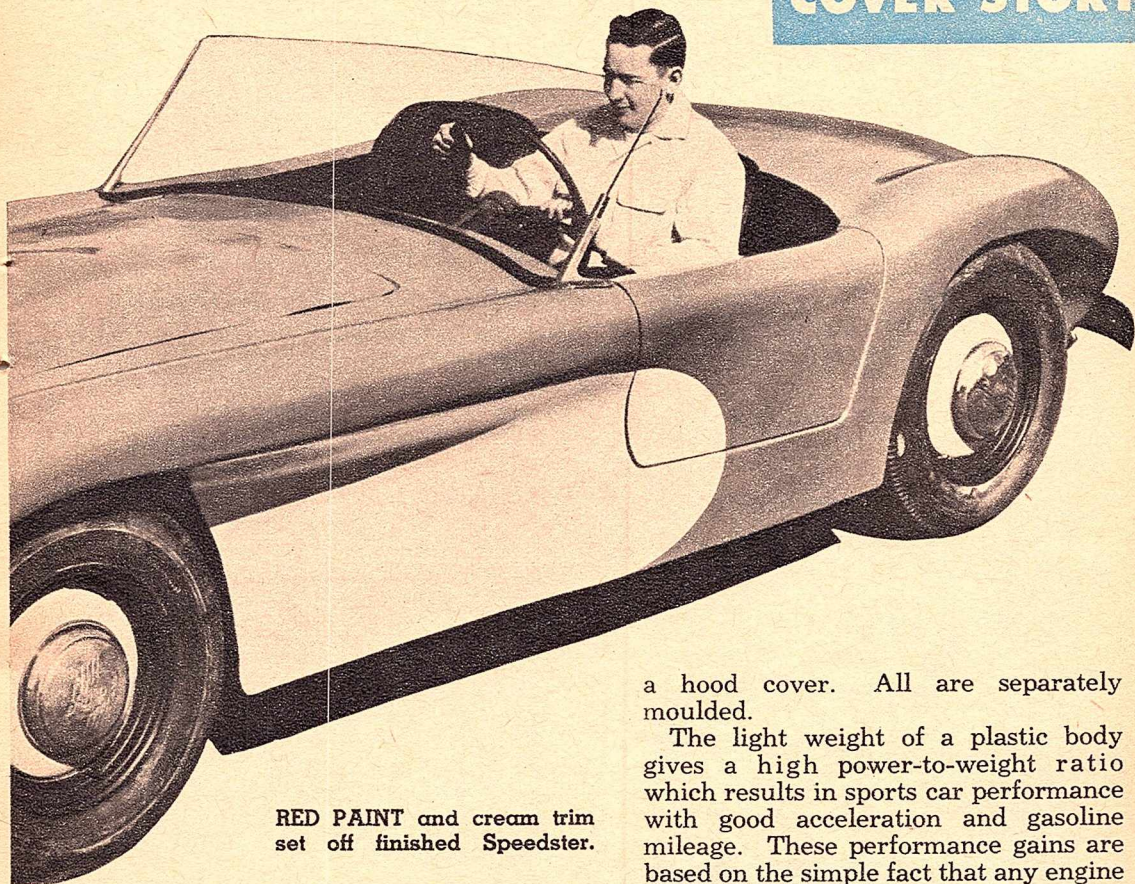


REAR VIEW of finished car. Taillights are from a 1950 Chrysler. Note twin exhausts.



CHASSIS can be altered from Ford, Chevy, Plymouth, Allstate, Willys or Henry J car.

COVER STORY



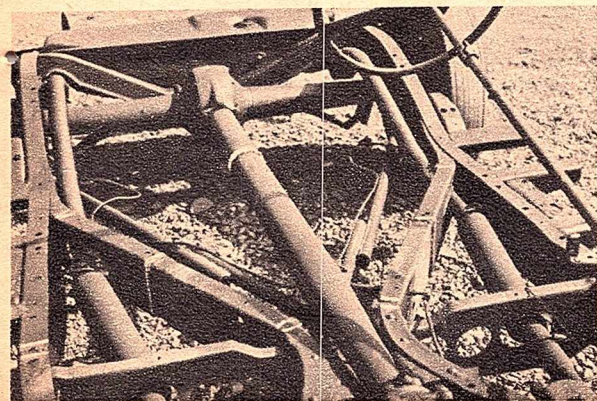
RED PAINT and cream trim set off finished Speedster.

required some cutting down, as described later on.

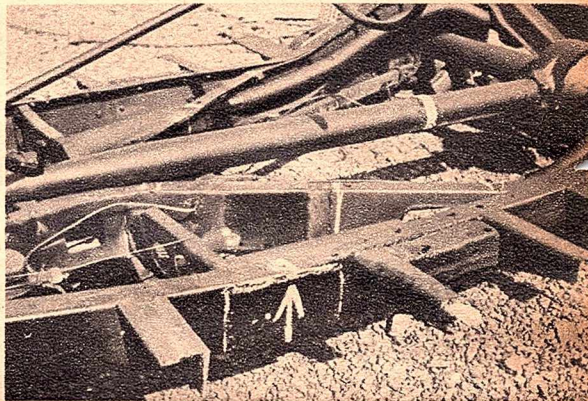
The body is made of lightweight Fiberglas construction and is delivered smoothly moulded which saves many hours of sanding. In addition to the body shell, you receive two doors and

a hood cover. All are separately moulded.

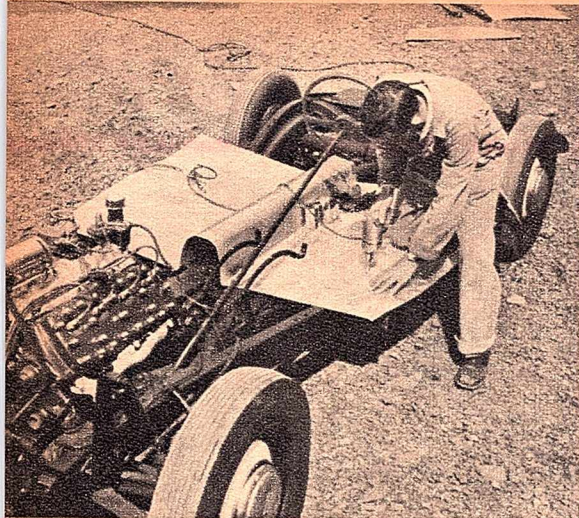
The light weight of a plastic body gives a high power-to-weight ratio which results in sports car performance with good acceleration and gasoline mileage. These performance gains are based on the simple fact that any engine will perform better when it's got less weight to push around. Fiberglas has other advantages in addition to its light weight (one-fourth the weight of a conventional steel body). It is strong, durable, rust-proof, dent-proof and sound-deadening. A properly-installed



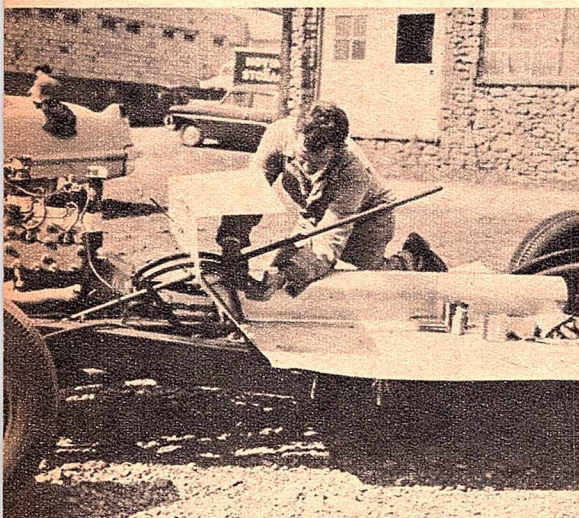
MEMBERS of frame are cut, overlapped and then welded as shown in photo above.



SIDE CHANNELS are cut, eight-inch section removed, then plate welded, arrow above.

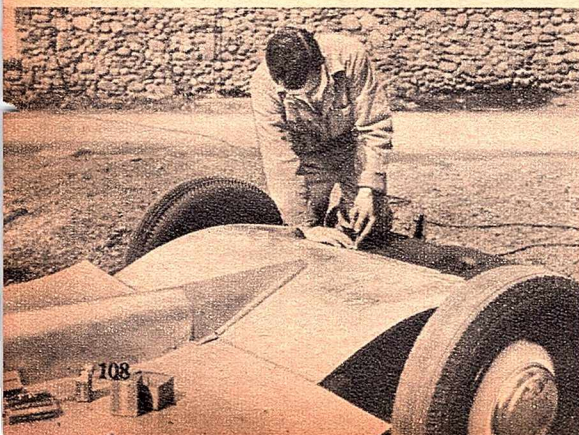


POSITIONING the sheet metal floor to the chassis. Note tunnel to clear drive shaft.



DASH consists of separate sheet. Rubber gaskets insulate metal from the chassis.

SELF-TAPPING screws are used to fasten the 1/32-in. sheet metal to the car frame.



body is exempt from rattles and squeaks.

Removing the Stock Body

The tools required to remove a stock body from its chassis are a heavy hammer, a large chisel and wrenches. Be careful to save the components which you will be using in your new car—headlights, taillights, trunk hinges (used on the doors), bumpers, dash instruments, steering wheel and seats.

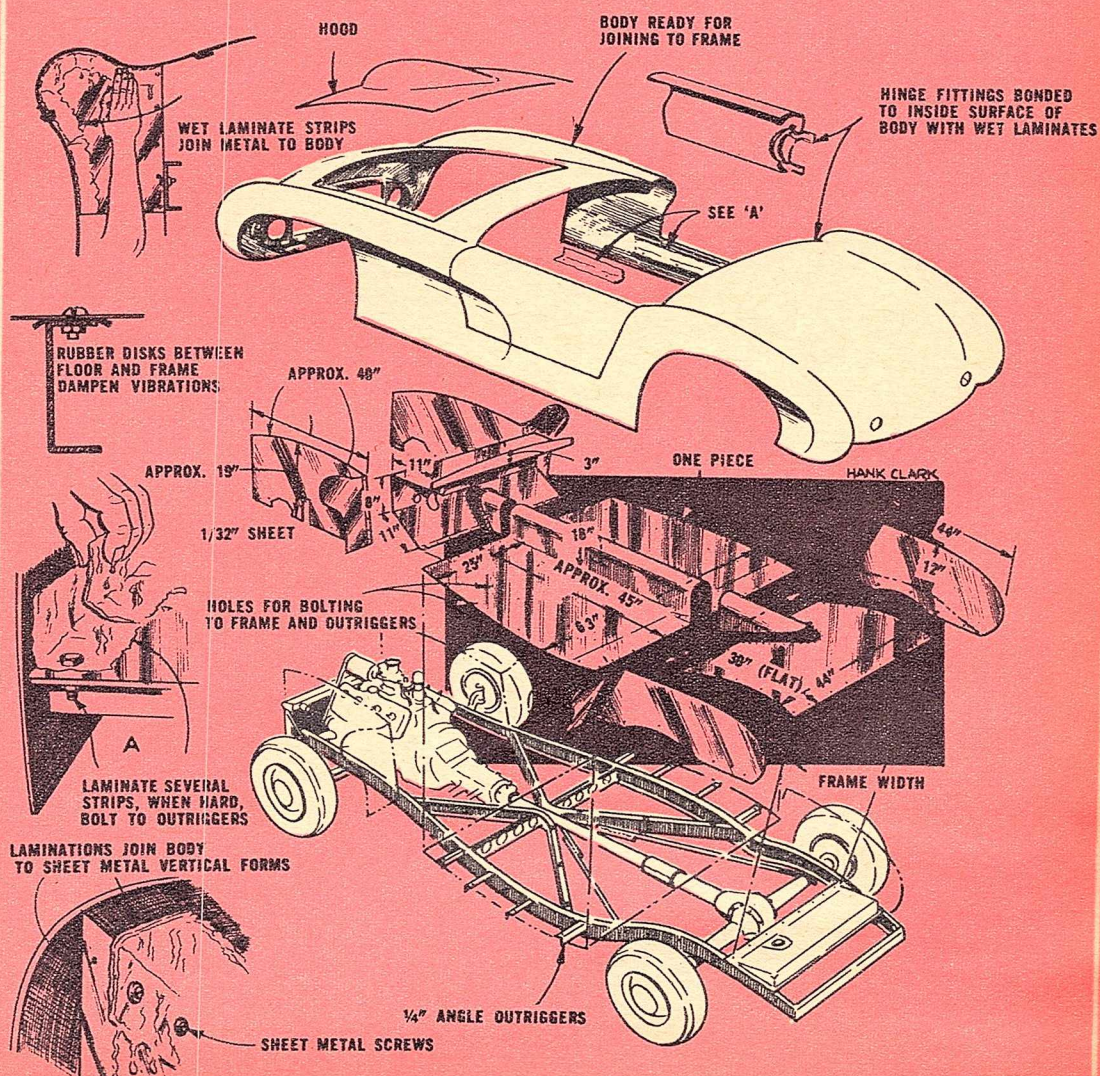
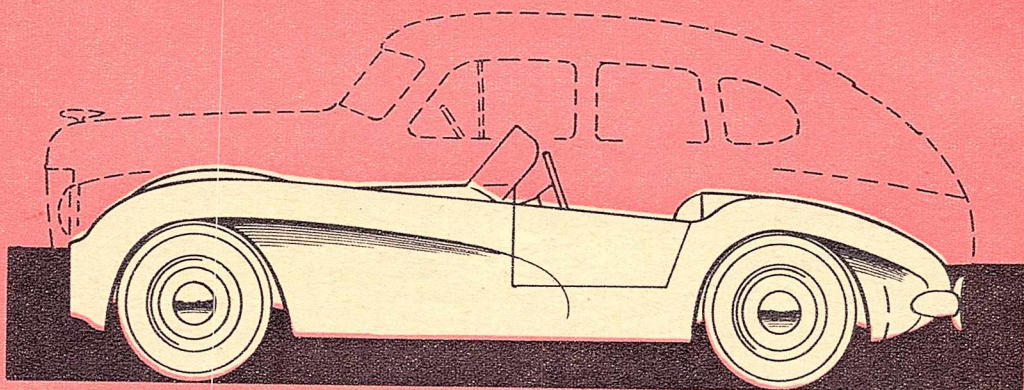
Lowering and Shortening the Chassis

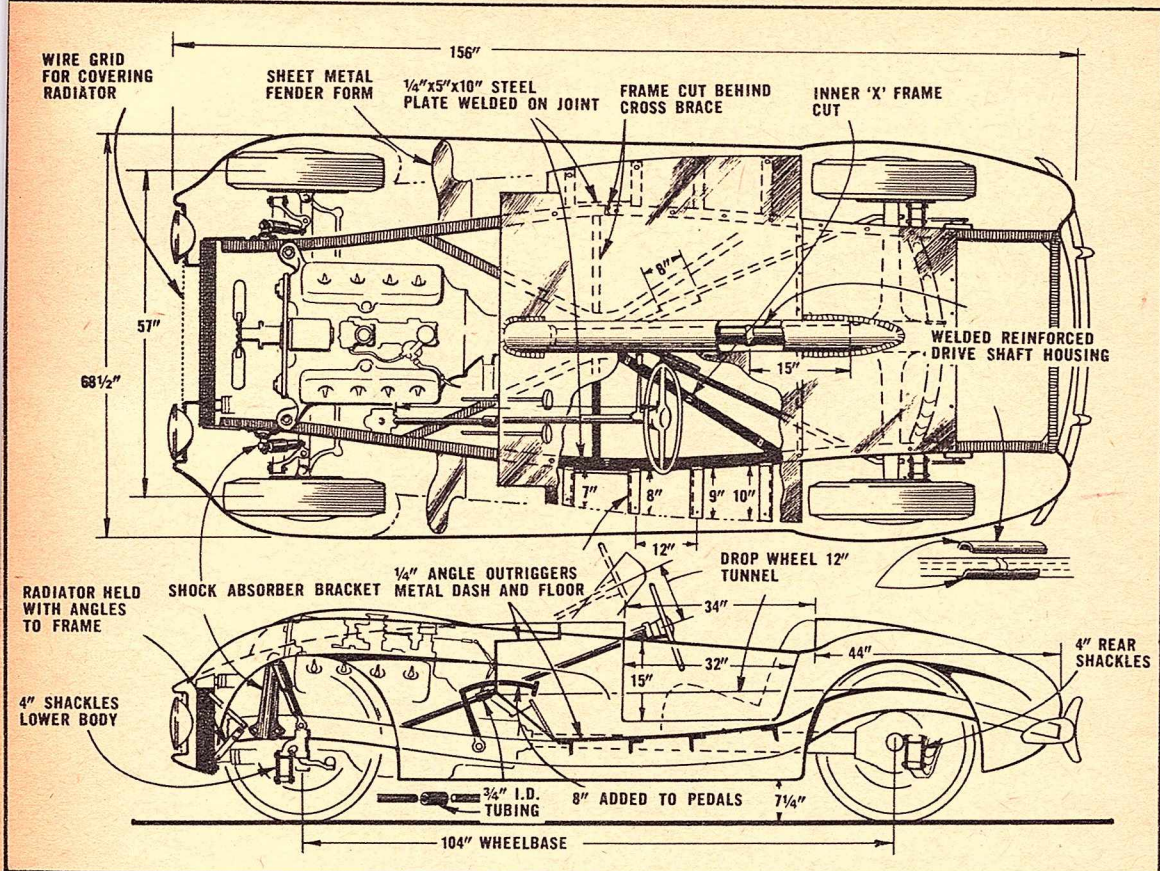
With short-wheelbase cars it is unnecessary to shorten the chassis when installing the Speedster sports body. However, in the case of the 1940 Ford conversion illustrated, it was necessary to shorten the wheelbase eight inches. This was done by cutting out an eight-inch slice from each side of the frame. The braces were only cut, overlapped and welded. The side-frame rails were butt-welded, then reinforced with a 1/4x5x10-inch steel plate which was welded to the outside of each side-frame rail. The rear radius rods were also cut and overlapped as shown in the drawing. Before welding be careful to prop up the frame so that horizontal alignment will be true. The frame shortening process is very simple but does require the services of an expert welder.

To lower the frame it was necessary to install four-inch spring lowering shackles in the front and rear. For improved handling, sway bars were also installed front and rear.

Shortening the Drive Shaft

The Ford drive shaft and torque tube must be reduced eight inches to correspond with the shortened wheelbase. To do this it is best to make the first cut directly through the drive shaft about 15 inches from the rear of the tube. An eight-inch section can be sliced out just ahead of this. The drive shaft should be electrically welded. It is best to true the drive shaft on a lathe. However, if a lathe is not available the shaft can be checked by using a straight edge or by revolving the shaft after it is in position on the chassis. The torque tube may be spliced together by slitting the eight-inch section you have cut out previously and welding each half around



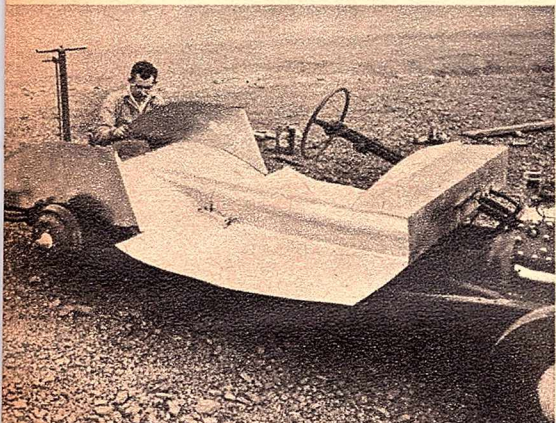


the torque tube to provide extra strength.

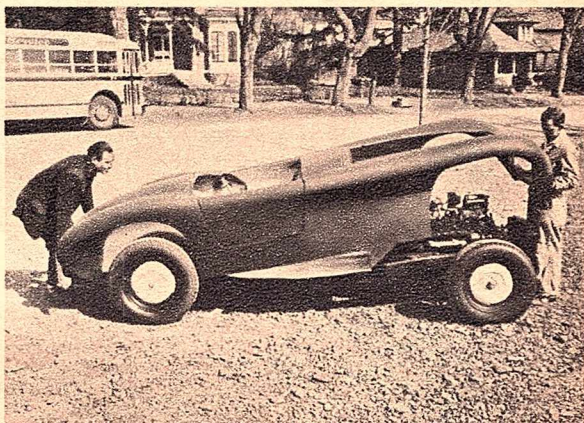
Lengthening Steering Post and Pedals

To lengthen and lower the steering column it will be necessary to cut off the entire steering column just above the steering box. Then take approxi-

mately 52 inches of steering column which may be cut from another junked car. The steering shaft should be welded to assure utmost safety. The steering housing is connected together with a piece of steel tube $\frac{3}{4}$ x1x4 inches. This lengthens the steering column approximately 11 inches. Next align the



FINISHING off the sheet metal work. Note cut-outs for pedals and steering column.



LOWERING the body in place. It's light but get a friend to help you position it.

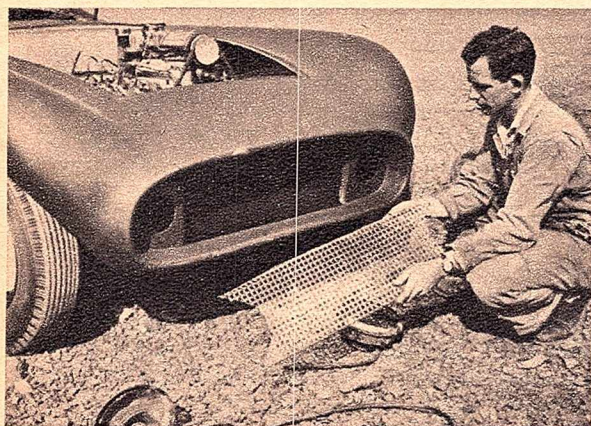
steering post, by removing the top bolts from the steering box and using the lower bolt as a pivot point, elongate the holes about one inch and reposition the steering post to the proper new angle.

Since the driver's seating position has been moved to the rear, it is necessary to extend the foot pedals. They may be lengthened by first cutting off the existing pedals at the foot rest angle and then adding another length of foot pedal extension to add eight inches to the total length. The angle will take care of itself since the lengthened pedals will travel in the same arc. The approximate cost of a used pair of 1940 Ford foot pedals is 50c. The gas welding cost is about \$1.

Bridge in two roll bars, one under the cowl and one just behind the seats. Roll bars can be of lengths of angle iron or tubing. This strengthens the entire chassis and is an added safety feature—found in most racing cars.

Radiator Modification

Because the stock Ford radiator was too high, it was swapped for a 1949 Nash radiator. The particular radiator used on this conversion was taken to a radiator shop where its top expansion chamber was cut down and flattened to the height of its upper inlet neck for five dollars. The modified radiator was then attached to the floor frame rail horns of the chassis using two one-inch wide pieces of scrap iron on each side. The radiator was set 9½ inches off the ground for a low rakish front end and smooth body flow.



THE GRILLE. Make a template of cardboard and cut one out of aluminum mesh as shown.

Outriggers

For additional strength, we added four outriggers, two to each side of the frame. The outriggers serve two purposes: they give additional strength and protection and they also serve as additional body tie-down points for attaching the body. Outriggers may be of stock angle iron or may be cut from an old auto frame. They are welded to the outside of the frame rails.

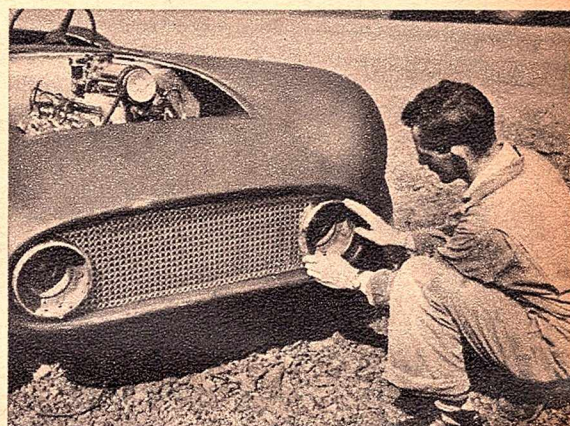
Constructing the Floor

In many cases it will be possible to use the stock floorboards as is. However, in the case of the Ford conversion it was necessary to construct new floorboards since the old ones were badly rusted. Less than three dollars' worth of 1/32-inch thick sheet metal was used to build the floorboards, firewall and rear fender wells. The rear fender wells serve the dual purpose of sealing out the weather as well as forming a neat luggage compartment inside the rear body deck.

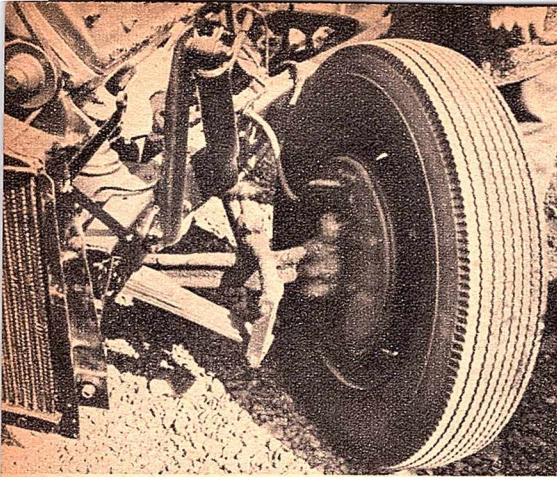
Positioning the Body

Place the body in the exact position it will occupy on the finished frame. With the body in position modify the floorboard to fit the contour of the inside of the body shell. It does not have to be a careful fit because you are going to connect the body side and the floorboard edge with a flexible, four-inch strip of plastic.

The outriggers provide a good sturdy base for the plastic body. Position the body against the floorboard as carefully



HEADLAMPS are from a 1950 Chrysler. The grille can be painted or left in aluminum.



FRONT-END view showing shock absorber mounting and cut-down, lowered radiator.



EPOXY RESIN saturated plastic fabric is used to seal the body to the frame of car.

as possible. Now line up one edge of the body and floorboard for fastening. Now lay a four-inch strip of Fibreglas so that one edge touches the floorboard and the other the body edge. After positioning it carefully and cutting it to fit, remove and saturate it with the special plastic resin bonding agent that comes with the kit. To saturate, place the Fibreglas on a piece of cardboard and paint on the agent. When you have one side fully soaked, turn it over and saturate the other side. Now wait about one minute and then press the saturated Fibreglas against the two areas to be connected. Press it into place all along the line. Let it dry and cure. Repeat this process until you have a channel all around the body frame.

When the Fibreglas channel is dry, drill holes every three inches around the floorboard edge and fasten the Fibreglas lip to the floorboard with sheet metal screws. Now drill through the floorboard and into each of the outriggers and bolt down at each outrigger point. At every point you attach body to frame or body to floorboard, use rubber gaskets cut from an old inner tube. Place them between skin and frame before bolting. At all points where the body is bolted to the frame, drill holes in the outriggers larger than the bolts to be used ($\frac{1}{4}$ -inch bolts, $\frac{1}{2}$ -inch holes) to prevent vibration.

The Fibreglas Epoxy Kit

Every Fibreglas sports body is delivered with a sufficient supply of Fiber-

glas, mat, resin, ground Fibreglas putty and hardening catalyst. The epoxy resin will adhere to any material, including clean metal. To use, mix approximately one teaspoon of the hardener to each pint of resin. Never mix more than you can use immediately, as the resin will tend to harden very quickly after the hardener has been added. Don't use in the hot sun, as the heat will accelerate drying and make laminating difficult. To fill small pot holes in the body, simply mix a small amount of the ground fibers into the epoxy to make a putty. Then add the catalyst drying agent in the proportion mentioned above. Remember, the more dryer that you use, the faster the resin will dry and cure. Too little drying agent, however, will make drying and curing too slow.

Preparing Body for Painting

The body is smooth-surfaced but does require a light sanding to remove the invisible releasing agent. Use a dry aluminum oxide sanding paper, fine grade, obtainable from any auto supply store. Sand the body thoroughly to remove the gloss which is the releasing agent. Use a synthetic primer rather than a lacquer because it is more elastic and has greater flexing qualities. Small pot marks or minor surface imperfections can be filled with regular auto body putty or putty made from whiting procured from any paint store.

The most inexpensive type of hood and door latch is the common garage

door upper pull or transom latch, which can be installed on the underside of the rear edge of the hood section. It can be actuated by a wire pulled from the dash. Doors must be hinged from the back; the hinges from any automobile trunk are ideal. An effective latch for the door can be made from garage door pulls or from window latches. To secure hinges and latches use ordinary sheet metal screws and then laminate the post or stationary portion with three layers of Fiberglas, to make it a permanent part of the sports car body. To make sure of a good laminating job, press the resin-soaked plastic firmly around the metal part of the hinge which is to be imbedded. Use tinfoil to prevent it from sticking to your hands. For extra support, a small piece of plywood may be inserted before laminating.

Mounting the Dash

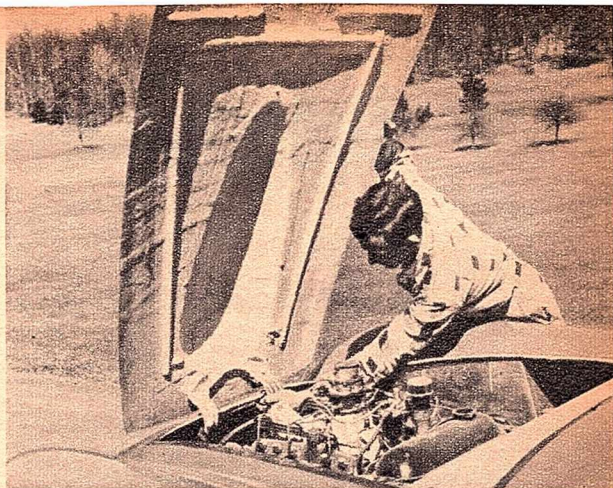
The dash, furnished separately, may be trimmed to lower or raise the cowl as much as 2½ inches. Before attempting to install the dash, make a cardboard template to conform to the shape of any changes in dimension and for positioning of the instruments. The cowl may be moved up or down as required in order to conform to the shape of the windshield to be used.

Seats and Grille

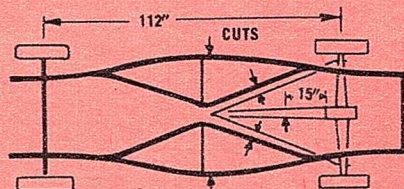
In sports car construction it is best to position the driver as near the rear axle as possible. This makes for better weight distribution and handling. This, and the fact that the drive tunnel is elevated, leads to the use of bucket-type seats obtained from an old delivery truck.

A small investment in sponge rubber, floor carpeting and a suitable upholstery material such as Boltaflex is all that is necessary to doll up the interior. If you prefer you can finish the interior of the car with two coats of paint.

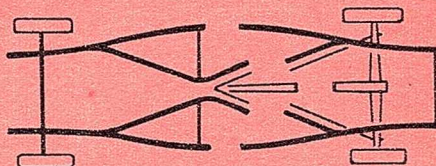
The plastic body has a grille opening which is adaptable to many [Continued on page 172]



WIDE-OPENING HOOD provides easy access to motor. Hinges are from old car trunk.



FRAME BEFORE CUTTING DOWN TO 104" WHEEL BASE



ALL CUTS ARE MADE AT SAME TIME

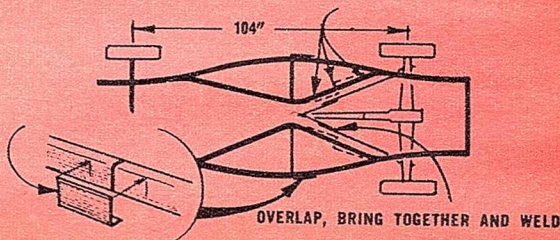
NOTCH ONLY
FOR BEND
(THIS NOTCH
WILL CLOSE)

REMOVE
8" SECTIONS

NOTCH ONLY

INSERT
FILLER
UNDER
REAR
NOTCH

NOW SHORTEN REAR FRAME ENDS BY 8"
ALIGN THE X FRAME CUT AND WELD NOTCHES



Disappearing Grinder

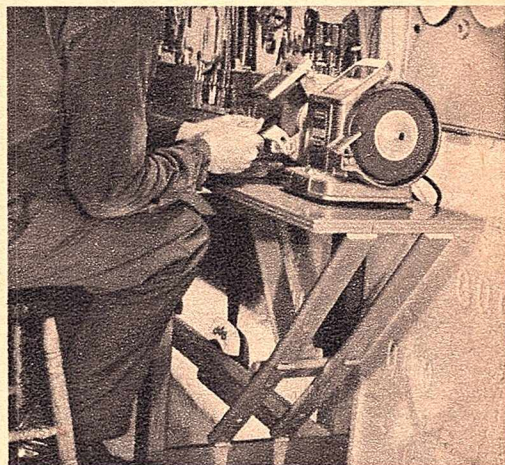
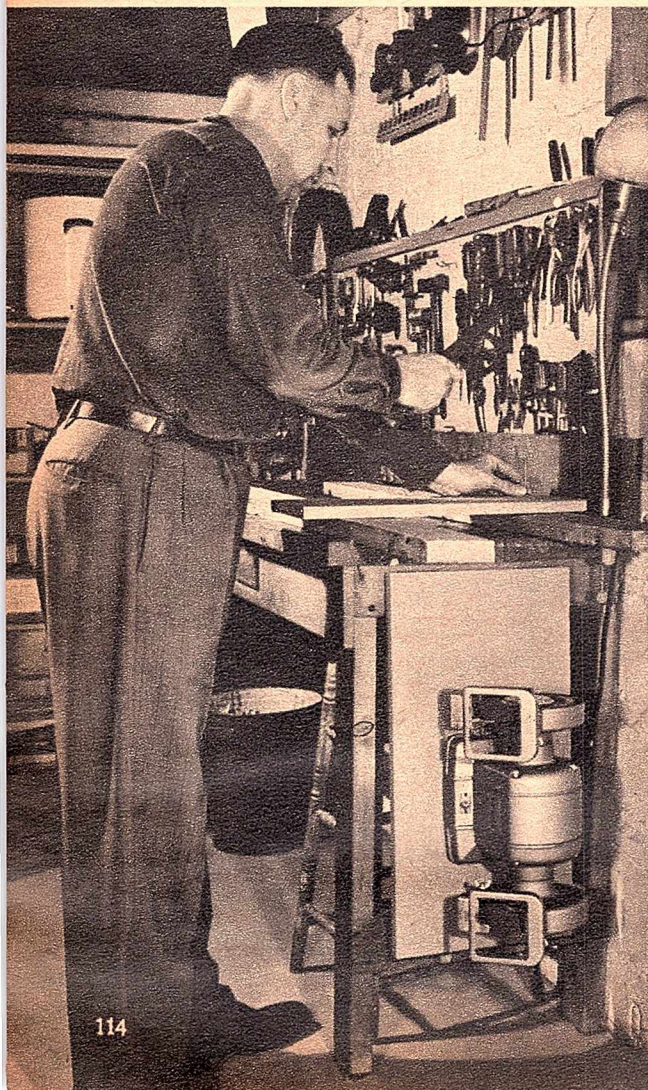
Lack space in your shop? Mount your grinder on a table that folds down at the end of the workbench.

By William A. Kaufmann

MOUNTING a grinder is no problem if you have room for a separate bench or pedestal, but you have to make the most of space when your workshop is small. Using the grinder table shown, you not only conserve space but make it possible to use the bench for work on long stock.

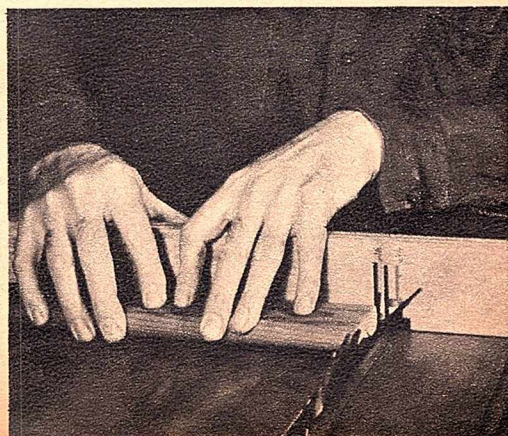
The table top is cut from $\frac{3}{4}$ -inch plywood. This thickness is necessary because the grinder must be bolted to a rigid surface that will not warp or twist. The braces can be cut from either hardwood stock or plywood. To install the braces, first hinge the table top to the end of the bench and then prop it in the

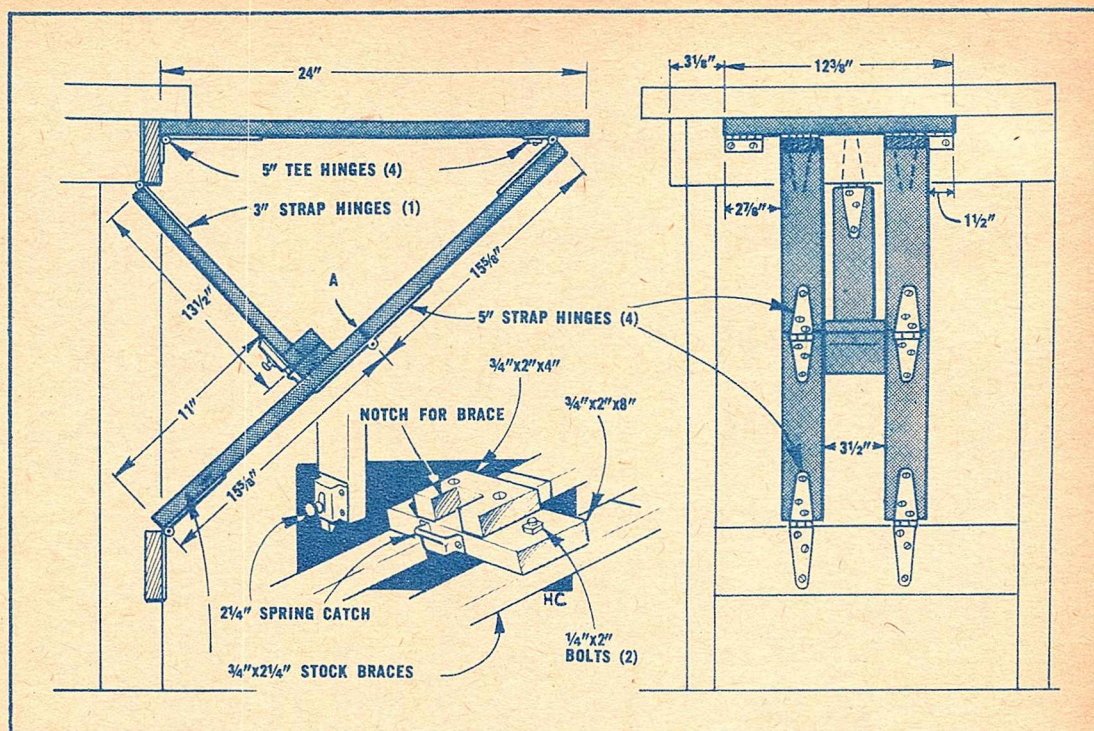
GRINDER is lowered (below, left) so long boards can extend beyond bench.



CONVENIENCE of folding grinder table is evident in photo above.

BRACES are cut to meet at angle of 5 degrees (point A in drawing).





horizontal position with a piece of scrap extending to the floor. You then can attach the folding brackets so that the table will always be horizontal when raised.

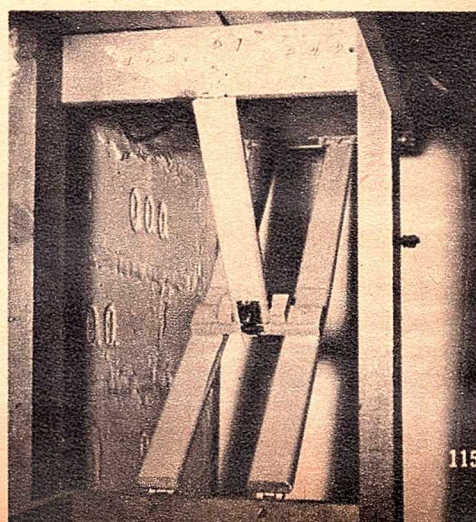
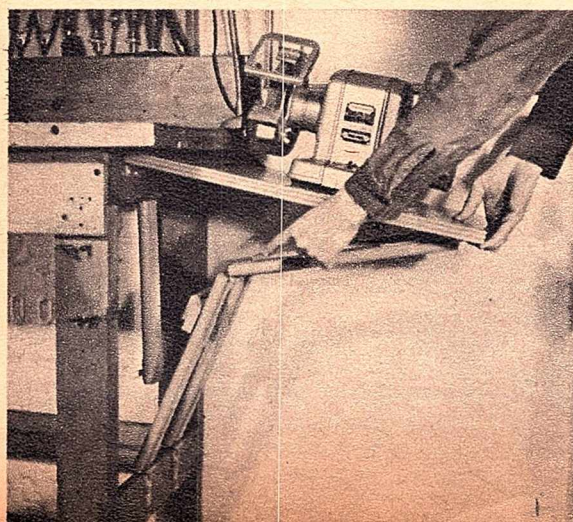
In making the folding braces, cut the ends which butt against each other at a 5-degree angle. This little trick will cause them to angle outward slightly when the table is raised, holding the weight up until the locking brace is snapped into place. Without the angle

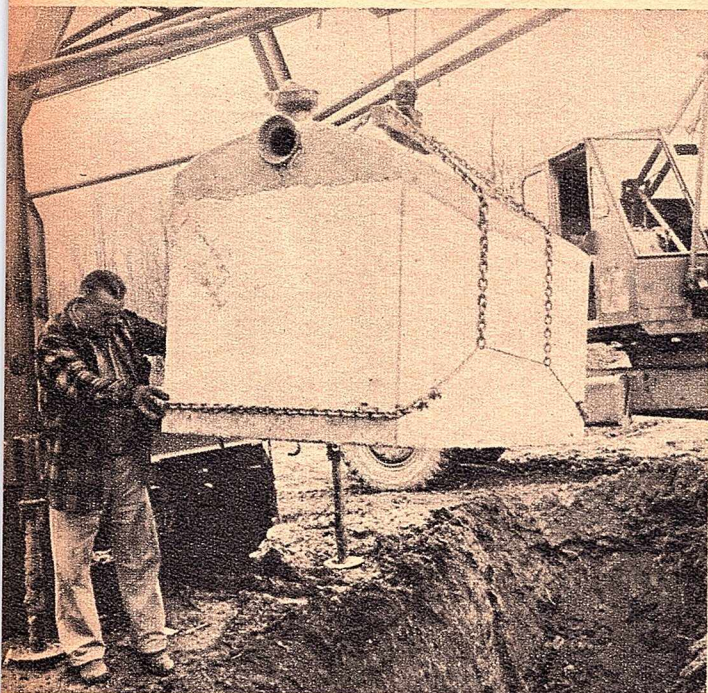
LOCKING BRACE under bench hangs freely after catch is released to drop the table.

cuts, there is a tendency for the hinges to snap back into the folded position.

When construction is completed, and the parts are sanded clean, apply a coat of sealer to the wood; then finish it with any color enamel you desire. Mount the grinder so that the bolts fall between the braces, preventing any interference when the table is lowered. With the grinder plugged in all the time, it is ready for use in a jiffy and out of the way when you don't need it. •

VIEW from below shows notched seat for locking brace, catch, simple construction.





PREFAB CONCRETE TANK is lowered into place. Tank's four sides will clear hole by 1 foot.

What You Should Know About **SEPTIC TANKS**

Home-built sewage-disposal systems can give you years of trouble-free service.

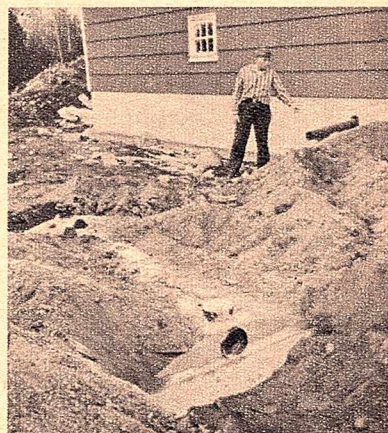
YOUR present or future home may have a septic tank. A proper understanding of its installation and function can save you trouble and costly repair bills.

The complete cost of a 750-gallon septic tank with drain-field installation is from \$400 to \$500. Cost of drain-field placements average \$1.50 to \$2 per foot and run about 150 to 200 feet.

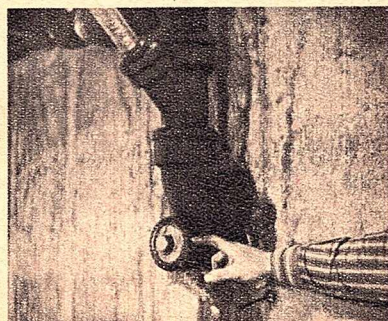
Septic tanks are installed where public sewers are not available. In most areas, the local health department or building inspector's office sets minimum standards regarding tank installations. A permit is required and inspection is mandatory before the tank is covered. In fact, if you are



ONE CLEANOUT DOOR is enough for this single-chamber tank. Sanitary tees at each end of the tank act as baffles.



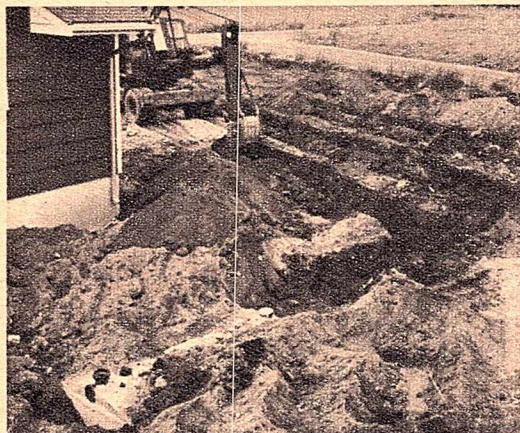
HOUSE SEWER PIPE should pass through the foundation and not underneath it. This lets waste flow easily to shallower tank.



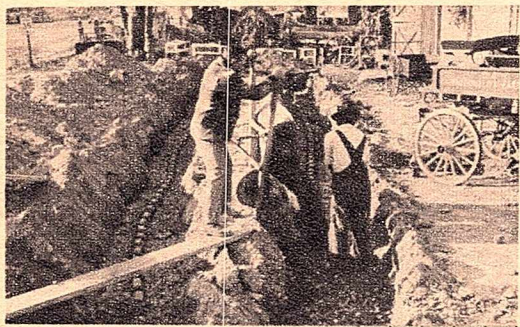
CLEANOUT PLUG is a mandatory installation where house drain is connected to sewer line.



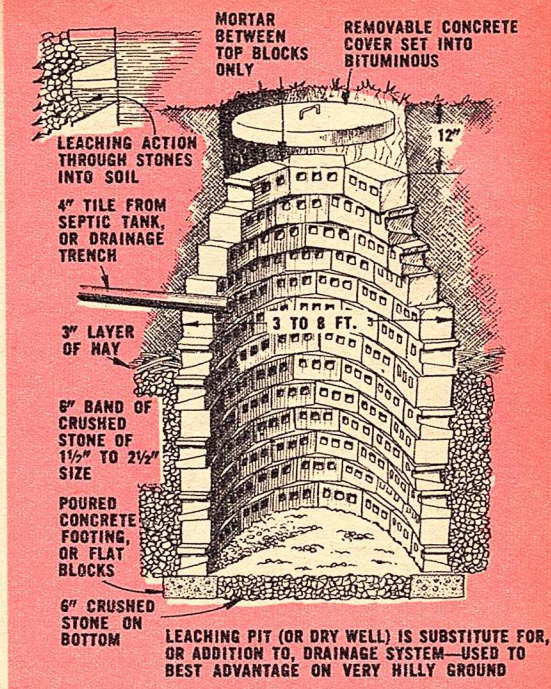
STOPPER VALVE is used to seal up sewer outlet. The outlet and soil pipe are then flooded with water via a vent pipe on the roof and the system is checked for leaks.



TRENCH DIGGER is shown excavating one of the lateral lines which will connect end of branch lines. In "open" field pattern, the branch lines come to a dead end.



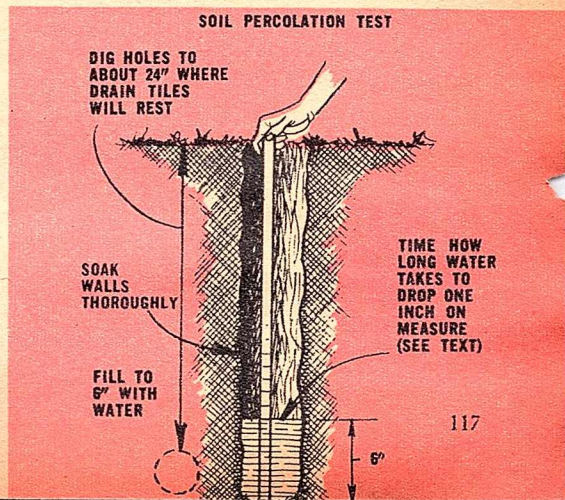
PIPE IS LAID to a depth of 18 inches on a 1-foot bed of gravel or crushed rock. Gravel bed is a must for proper leaching.



planning to build, go to these authorities before you buy your lot and work out your drainage problems in advance.

Septic tanks are underground, water-tight containers that dispose of sewage by liquefying it. This liquefied waste is then carried off by drain tile lines or else goes into a leaching pit and is absorbed by the soil and rendered harmless by the chemical action of the soil's bacteria.

Since cesspools do not accomplish this bacterial disintegration, they are not recommended. At best, they must be considered temporary expedients and should be installed only with the approval of the authorities. Installation of a cesspool should follow the pro-





TAR PAPER STRIPS wrapped around pipe connection points prevent backfill from clogging joints when trench is refilled.



LEACHING PIT must be installed when terrain makes disposal lines impractical. This one is made of concrete blocks and rock fill.

cedure given later in this story for the construction of the leaching pit.

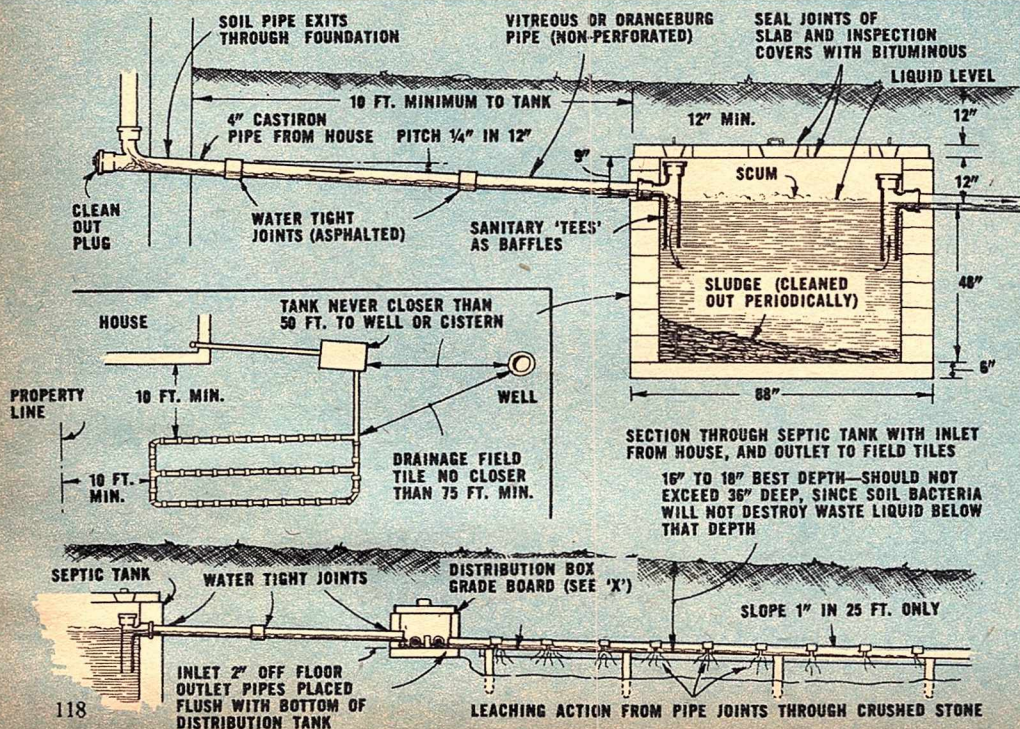
The minimum size for any septic tank is 500 gallons but a 750-gallon size is recommended. The larger tank needs cleaning less frequently and soon repays its additional cost. High-quality tanks have two chambers that afford superior bacterial action and require cleaning only once every four or five years.

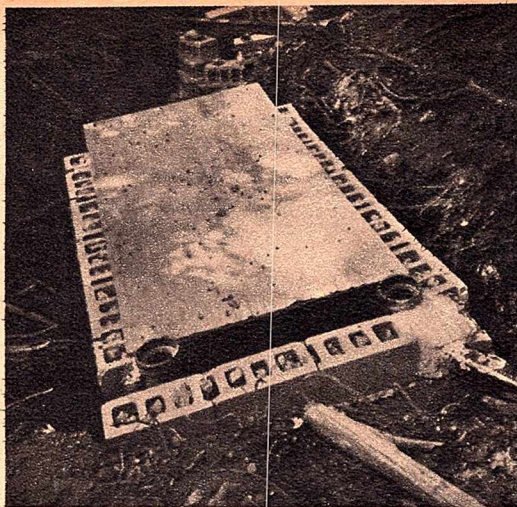
When soil has poor permeability, or when bathrooms are at opposite ends

of the house, a split system is recommended using two minimum tanks rather than one large one and two separate drainage fields.

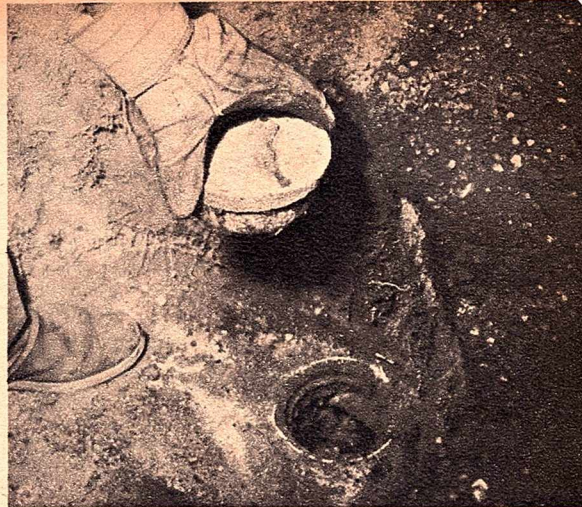
Tanks made of reinforced concrete are best. A 750-gallon tank delivered to your excavation costs about \$90; a 1,000-gallon size, about \$140.

Most tank manufacturers won't deliver beyond a 25-mile radius, so if you are in a remote or inaccessible area your only recourse will be to build the tank yourself. While a reinforced con-





HOME-BUILT TANK has inlet pipes at both corners to accommodate a double sewer line. Note leaching pit in background.



INSPECTION PLUGS should be installed at both inlet and outlet points. Repeatedly flushing a toilet will show rate of flow.

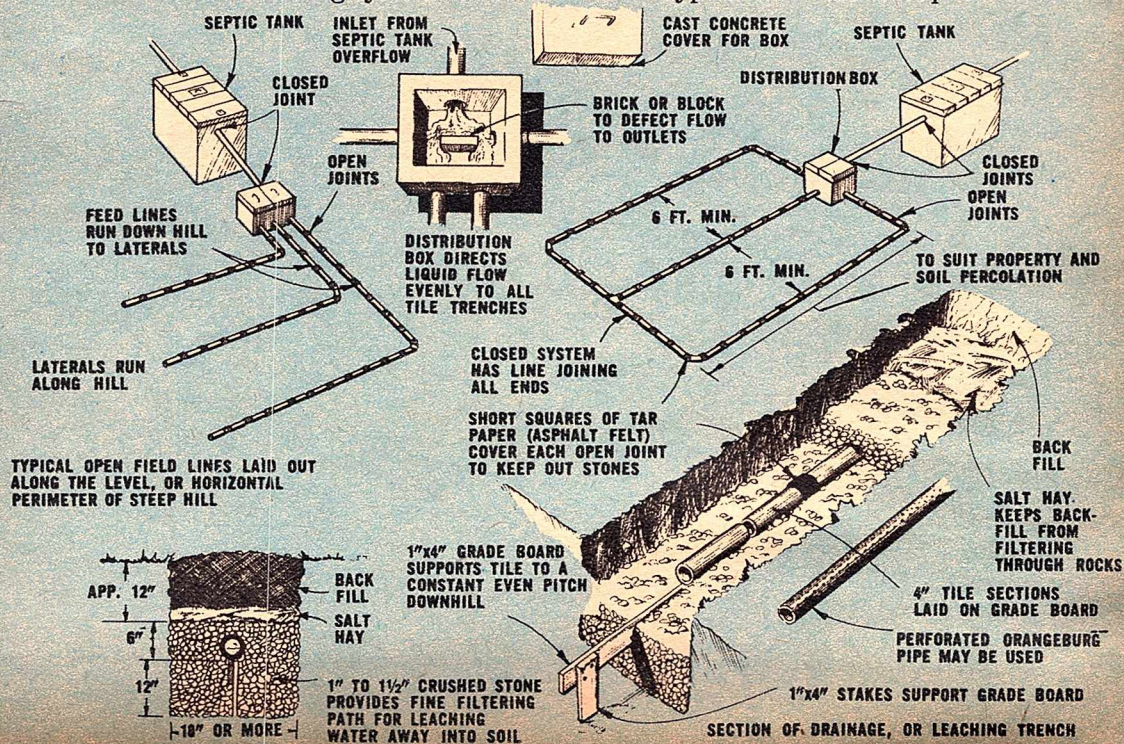
crete tank, poured on the site, is recommended, one built of concrete block usually offers fewer problems to the average handyman.

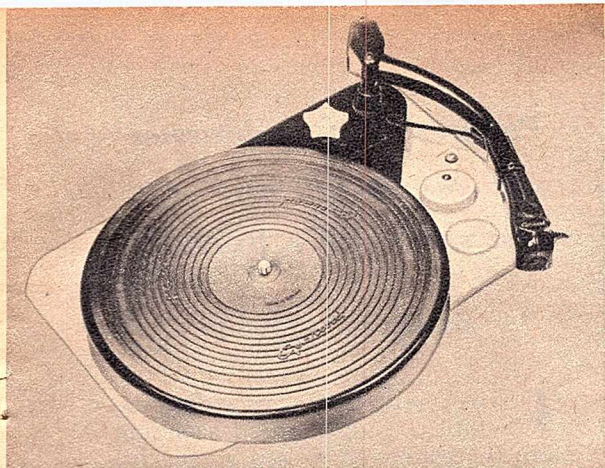
Either installation requires a drain field. Most commonly this is a 4-inch drain-tile pipe line—often of perforated fiber or Orangeburg pipe—100 to 200 feet long leading from septic tank to drain field. Place strips of tar paper over tile joints to prevent clogging by backfill. If more than 150 feet of tile is needed, a branching system of two or

more lines is recommended. Some fields are "open" which means their branch lines run to a dead end; other fields are "boxed in" with lateral pipe running across the end of the branches.

In the case of multiple disposal lines, a distribution box may be used. This is a concrete or masonry box measuring approximately 20x52 inches and 24 inches deep. When set where the main line branches, it distributes an equal amount of waste into the several lines.

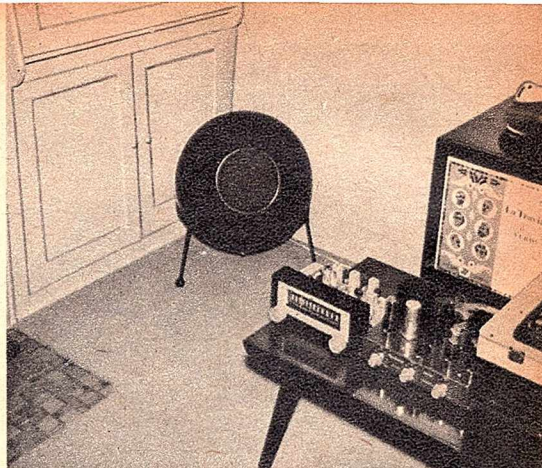
A typical tile line occupies a ditch





FOUR-SPEED single record player with high reproduction quality is built for low-budget hi-fi systems.

British Indus. Corp., 80 Shore Rd., Port Wash., N. Y.

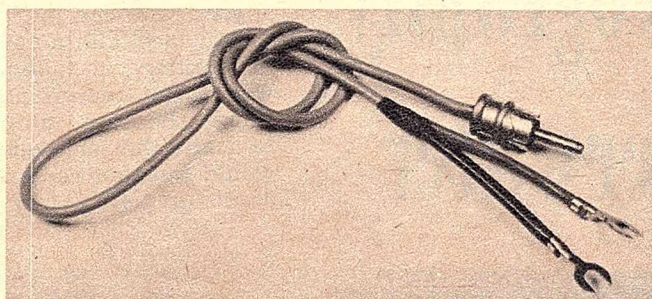


SPHERICAL loudspeaker enclosure is made of Fiberglas, comes in three sizes for 8, 12 and 15-in. speakers, sold with stand.

Wilber Enterprises, 3501 University Ave., San Diego 4.



What's New In High Fidelity



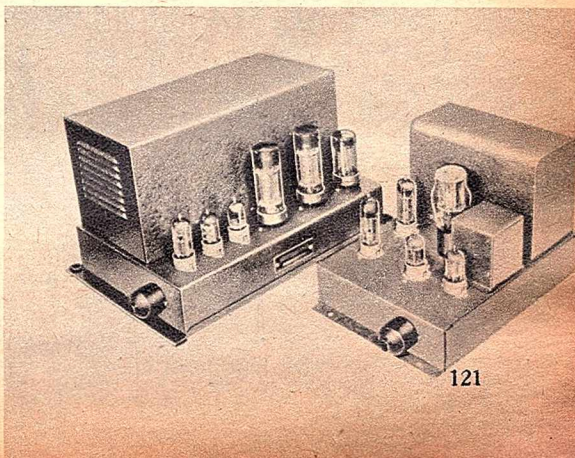
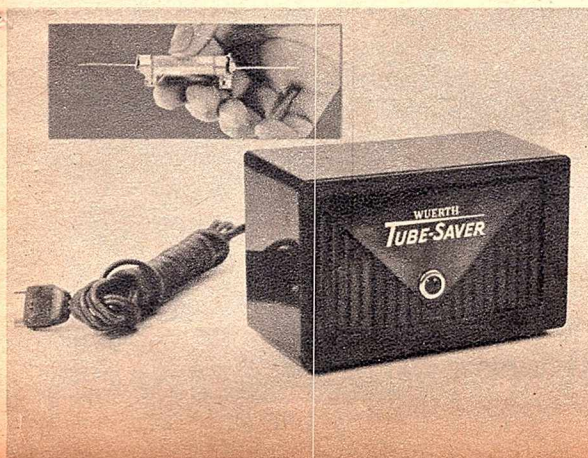
CONNECTING CABLES for hi-fi components are made with male, female or spade ends; H. Smith, Inc., Brooklyn 10.

TUBE SAVER reduces the starting heater voltage about 60% of normal for first 10 seconds, delays surge until tubes warm up.

Wuerth Tube-Saver Corp., 9125 Livernois Ave., Detroit 4.

AMPLIFIER, left, drives mid-range speaker, right one drives electrostatic tweeter and two woofers in Tri-Channel audio system.

Ereona Corp., Electronic Div., 551 Fifth Ave., N. Y. 17.





*Pictures taken underwater
are fascinating—and you
can start with a Brownie.*

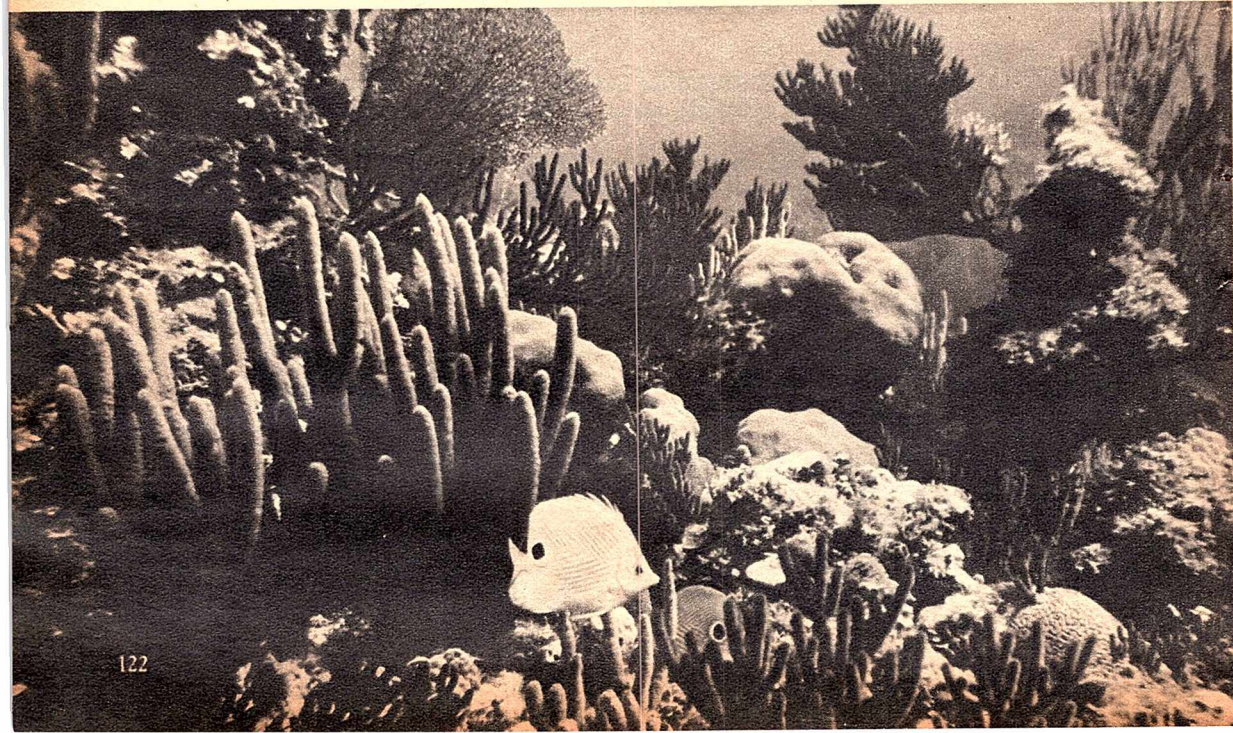
By Elgin T. Ciampi

TODAY, with their eyes wide open, countless people are descending into the waters to view a wonderful new world—the last frontier on earth. Equipped with mask and underwater breathing apparatus, or just the mask and a snorkel tube, your vacationing neighbor may be exploring the depths right now.

When you go below for the first time, you needn't regret that you're not carrying a camera. We've reduced underwater photography to its simplest terms by designing a waterproof case for the Brownie. With it, anyone who can put his head below the surface, aim a camera and click the shutter, can take pictures underwater. But there's no need to stop there; the case, simple as it is, is basically the same one in which you would put any camera to go to any depth up to 100 feet. So, no mat-

Photography Underwater

All photos by author



ter what camera you own, read on.

Clear plastic, $\frac{3}{8}$ -inch thick, is used for our case. Besides being impervious to sun, salt and water, it allows about 92 per cent of all light to pass through, making it equivalent to the finest optical glass. Though easily scratched, it will last indefinitely if given care. However, scratches aren't important except on the cover, through which we aim the lens—and that is merely a flat sheet which is easily replaced.

The drawing shows the dimensions for the Brownie case. Note that it is nothing more than a simple box with the back side extended to form handles and the other side open. The open side receives the cover which is held on by brass bolts passed through the flanges cemented to the sides. The flanges, incidentally, should never be spaced more than $2\frac{1}{2}$ inches apart on a case that is to be carried down 15 feet or more. Between the cover and the case, a flat, $\frac{1}{8}$ -inch gum rubber gasket makes the joint watertight.

Cementing of the case, glands and flanges is accomplished with a solvent for the plastic: ethylene dichloride. It is available from plastic dealers. Be certain the surfaces to be joined are clean, flat and square; otherwise a watertight

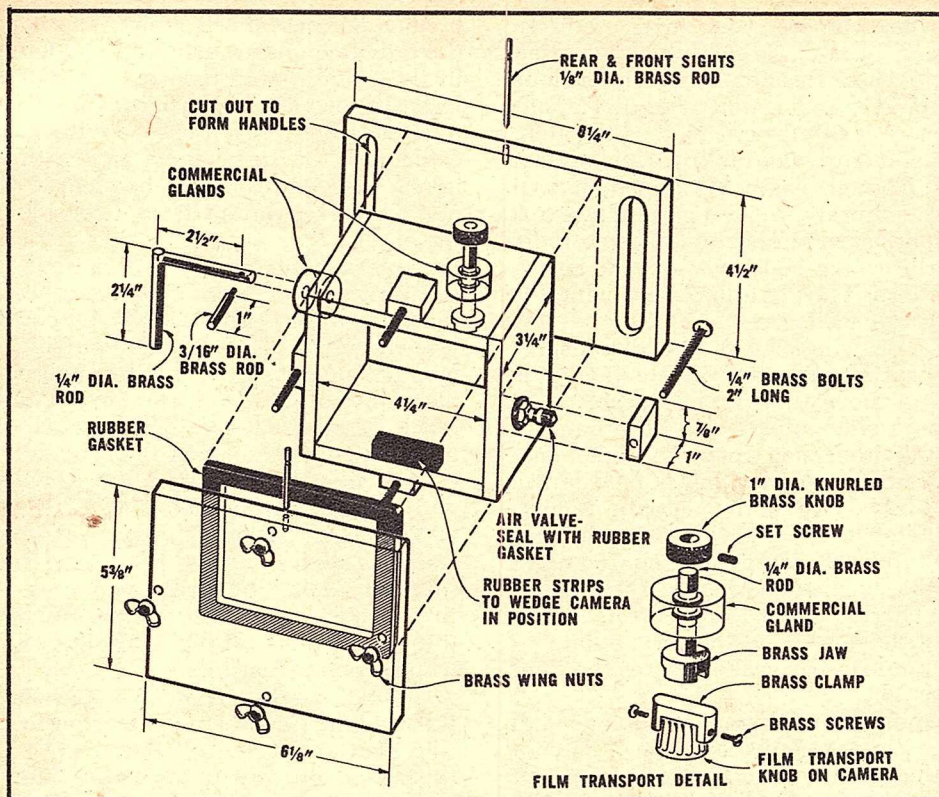
bond is not possible. To make the bond, dip only one of the surfaces to be joined in the solvent and keep it there for at least 30 seconds. Then press the pieces together and apply pressure with large C clamps. Let them set for two or three hours. The joints should be clear without bubbles running from one side to the other.

Camera controls are not difficult to install; the real secret of success lies in the watertight O-ring glands. Of course you can make these glands yourself, as we did for our case, but it's much simpler to buy them from Richard's Aqua-Lung Center, 233 W. 42nd St., N. Y., N. Y. The glands sold are the type shown in the film transport detail drawing, with two O-rings in the center; they sell at \$2.25 each. A gland with a $\frac{1}{4}$ x4-inch stainless steel shaft and a winding knob sells for \$2.95. Richard's also sells the tire-type air valve used for pressurizing the case; it is \$1.00, complete with waterproofing gaskets.

Control shafts are made as shown in the drawing from stainless steel or brass. The shutter and wind controls are the type used on any underwater camera case. For more complicated cameras, you can make similar controls of your own design. Where the lens is in a focus-

CORAL REEFS, like those in warm waters of Bahamas, provide excellent subject matter.



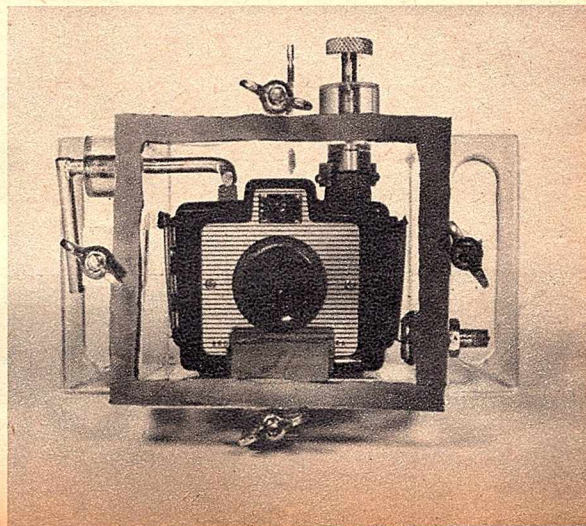
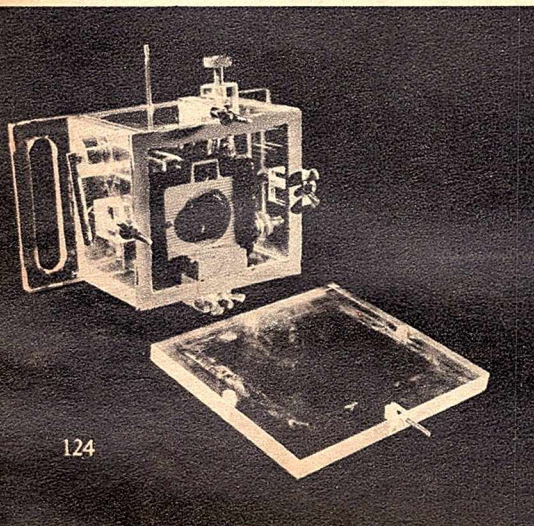


ing mount with variable diaphragm openings, gear rings (made by cutting out the center of a gear to fit the diameter of your lens barrel) can be slipped over the mount and secured with set-screws. These gears are then operated by other gears secured to the ends of control shafts. Brass gears in all sizes can be purchased from L. C. Bigelow, Inc., 250 W. 54th St., N. Y., N. Y. If your

camera has a tripod socket, install a gland at the bottom of the case and pass a threaded shaft through for mounting the camera within. For securing knobs and other controls, use brass screws throughout.

Test your case in the bathtub before taking it underwater. Through the air valve, take about 15 strokes with a hand pump, then submerge the case. Air bub-

CASE for Brownie is shown below. Note how control shaft works shutter release.



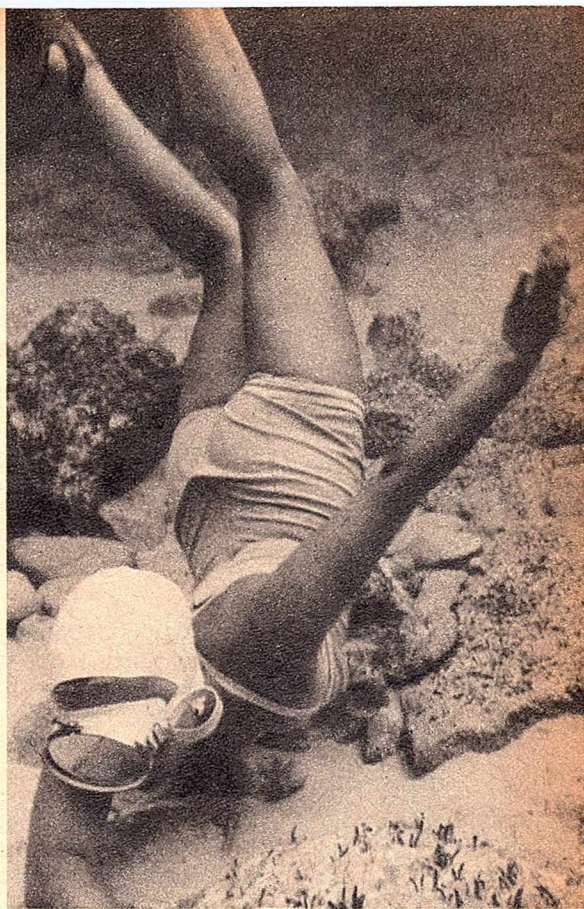
BRIGHT BOTTOM reflected light for shot taken with a 35mm Praktina in six feet of water; setting: f:11 at 1/100th on Plus X.

bles will locate any leaks. For general use, up to a depth of about 30 feet, eight strokes of the pump should be sufficient.

Taking pictures with the Brownie is simplicity itself. Outdoors, on bright, sunny days, load the camera with Tri-X film and you're ready to go. Shoot relatively close to the surface in shallow water; there's no need to go deep to get interesting photographs. Since both you and the subject will probably be in motion, hold the camera as steady as possible. Try to avoid aiming it toward the bottom; you'll get your best shots parallel to the surface or from an angle slightly below your subject.

Naturally, other factors are involved for those taking pictures with more complicated cameras. Of all cameras used underwater, the 35mm is considered best because of its compactness and large film capacity. The single-lens reflex is ideal since you can view and compose your picture right through the case. (For cameras with eye-level viewfinders, a sports finder must be mounted on top.) As for a lens, the wide angle is best because of its great depth of field; a 28mm lens will eliminate practically all focusing.

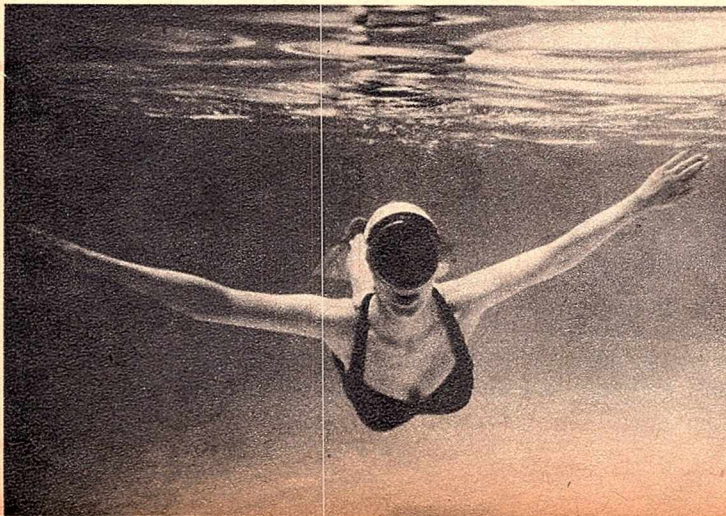
Light conditions vary underwater. There is a natural decrease in intensity as you go deeper. Available light is also affected by surface conditions. On calm water, about four per cent of the incident light is reflected; when the surface



is choppy, as much as 30 per cent may be bounced back. Contrast is also decreased, due to plankton and silt in the water. Thus the closer you get to your subject, the more contrast your pictures will have. Then too, colors are filtered out with increasing depth: red and orange first at 15 feet, then yellow at 30 feet.

[Continued on page 162]

BROWNIE was used to take these two shots of mermaid Nora Wheatley in sunlit pool.



What You Should Know About Today's Wiring

*Modern appliances call for
ever-increasing voltages—
here are some reasons why.*

By Robert Hertzberg

WITH appliance dealers pushing 220-volt air conditioners instead of 110-volt models, and automobile manufacturers adopting 12-volt instead of six-volt ignition systems, the general public is getting the impression that these higher voltages "have more power" and "do a better job" than the lower ones.

This is nonsense. There is a sound technical reason for the shift to higher operating voltages, but it concerns the *wiring* in a house or a car and only incidentally the appliances themselves. But first, let's define some electrical terms:

volt: a measure of electrical pressure

ampere: a measure of rate of flow

watt: a measure of electrical power

(amperes x volts = watts)

In the past, the standard voltage in the United States was 110. Today the actual energy delivered to a house often exceeds 110 volts. In designing their products manufacturers generally figure 115 volts for appliances, 117 volts for electronic equipment and 120 volts for lamps.

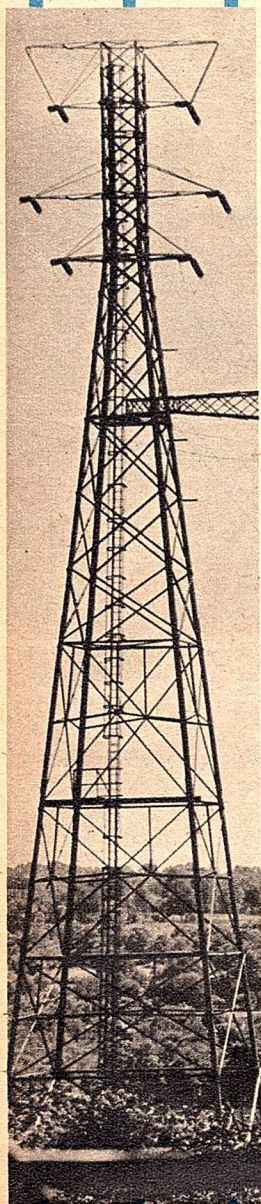
Two wires leading from the power company's poles to the electric meter in your house means that your service is 115 volts.

Three wires indicate a combination of 115 and 230 volts; that is, 115 volts between a grounded neutral wire and either outside "hot" wire and 230 volts between the two "hot" wires. In many houses the three-wire, 230-volt connections stop at the fuse box and it is from this point only that pairs of 115-volt wires fan out to the various rooms.

The voltages of a three-wire service might be designated as 110/220, 115/230 and 120/240. For the sake of convenience, let's deal with the 115/230-volt figures, singly and in combination.

The power rating of an electrical machine is expressed briefly as the product of its operating voltage times the current in amperes it draws from the line. The result of this multiplication is called watts.

With all direct-current devices (now confined mostly to automobiles) and with all heat-generating appliances using



TYPICAL POWER PLANT at Devon, Conn., generates 13,000 volts. The plant's sub station then steps this up to 115,000 volts.



alternating current, this rule applies: volts \times amperes = watts. With all AC-operated motors, fluorescent lights, radio and television sets and similar electronic equipment, the true wattage remains slightly less than the straight volts \times amperes value or *apparent power* but still close enough for comparative purposes.

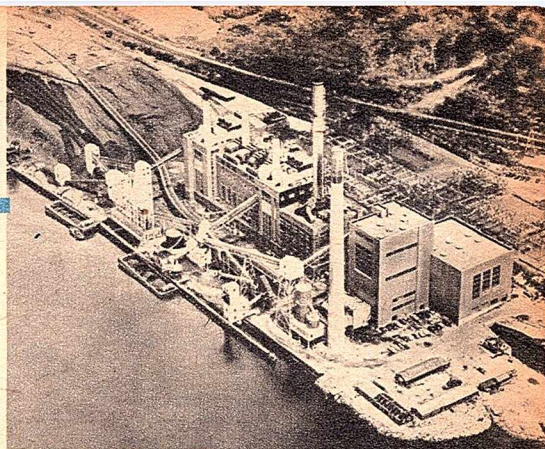
The volt-ampere relationship persists regardless of the size of either figure. An appliance will do exactly the same work whether it is built to operate on 115 volts and 10 amperes or 230 volts and 5 amperes; the volt-ampere product is 1150 watts in either case. Many of the motors powering shop machines today are built to run on either a low or high voltage line by transposing their leads. Still their power ratings remain the same.

For example, the nameplate of a typical $\frac{3}{4}$ -hp motor reads 115/230 volts, 10/15 amps. A little arithmetic shows that 115×10 is the same as 230×5 : 1150 watts.

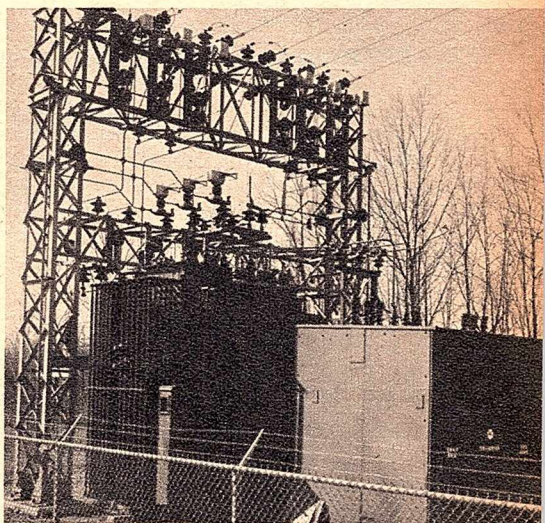
Greater amperage drawn by an accumulation of appliances in a home requires more wiring of a heavier gauge to carry it. The friction resulting from forcing too much current through inadequate wiring will actually heat up the wires. With enough of an overload, an improperly fused line can start its insulation smoldering. If such wiring is not enclosed in protective metal sheathing, it can readily set fire to the woodwork. A reduced overload may not start a fire, but it will rob appliances of the necessary voltage required for normal operation.

Higher Voltages Cut Losses

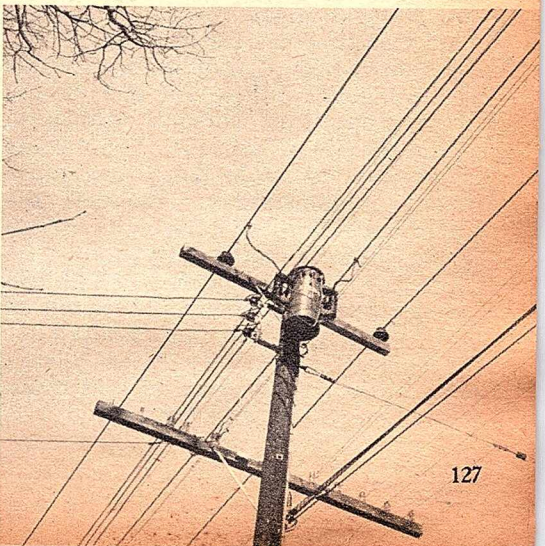
Some heat waste and voltage loss must be expected on all power circuits, but the effects can at least be minimized by the use of heavier gauge wire. The drawback here is that adequate installations for our ever-increasing household loads require very thick wires. These are difficult to install and much more expensive. The sensible and



NEIGHBORHOOD SUB STATION is fed 27,000 volts from a larger one, then steps voltage down to 4800 for local distribution.



SMALL TRANSFORMER atop pole steps down current a third time to 120/240 volts for home use. Transformer serves six homes.



Room Air Conditioners		Heating Equipment		Dishwasher		Sewing Machine	
1/2 Ton	880	Warm Air Furnace Fan	320	Dry Iron	1025	Serving Tray	600
3/4 Ton	1255	Oil Burner Motor	230	Egg Cooker	440	Shaver	11
1 Ton	1540	Humidifier	185	Fans		Steam Iron	1040
Aquarium Aerator	50	Ice Cream Freezer	115	Floor Circulator	120	Sun Lamp	275
Aquarium Heater	up to 250	Ironer	1455	Attic	345	Tea Kettle	550
Blanket	175	Knife Sharpener	50	Kitchen Exhaust	75	Toaster	1130
Blender	275	Odorizer	11	Portable	50	Trivet	50
Bottle Warmer	440	Pressure Cooker	1400	Floor Polisher	475	TV Receiver	205
Broiler	1400	Power Tools	up to 1000	Food Freezer	up to 460	Vacuum Cleaners	
Casserole	510	Projector	300	Food Warmer	310	Bag Type	340
Clock	2	Radio	30	Fry Kettle	1300	Canister Type	725
Clothes Dryer	4760	Range	up to 23000	Frying Pan	1085	Tank Type	555
Coffee Maker	up to 1000	Recorder	95	Food Mixer	130	Hand Type	310
Corn Popper	440	Record Player	50	Hair Dryer	415	Vaporizer	385
Dehumidifier	185	Refrigerator	230	Heat Lamp	250	Waffle Baker	960
Door Chime	15	Roaster	1320	Heating Pad	60	Washer	
		Sandwich Grill	960	Heater	up to 1650	Automatic	400
						Non-automatic	380

LOAD CHART lists appliance wattages. Add your consumption to check your present wiring.

economical way to cut down line losses is to cut down the line current by using a *higher* voltage. Remember, as long as the volt-ampere combination is the same, operation is the same. The important difference is that current waste is greatly reduced.

This is why dealers and utility companies urge the use of 230-volt air conditioners in homes already having three-wire, 115/230-volt service. While a separate line must be run from the air conditioner to the meter, it is much cheaper than replacing an existing light-weight 115-volt circuit to permit the use of a 115-volt box.

Although doubling the voltage from 115 to 230 might seem to create a new insulation problem, it doesn't. Insulation is cheap and practically all wiring and fixtures made for 115 volts are wholly satisfactory for 230 volts.

Shock danger is indubitably greater at the higher voltage, but then this is to say that it is worse to drown in a lake than in a bathtub. Any voltage above 50 volts can be dangerous under certain circumstances. Exercise the same precaution with 230 volts as you would with the regular 115 volts.

The copper-wire economy of high line voltage has long been appreciated in Great Britain where the standard for all household purposes have always been 240 volts. Because of that country's climate, air conditioners and food

freezers are virtually nonexistent and even electric refrigerators are rare. However, large electric heaters for room comfort are much more prevalent than in the United States and their use on 240 volts means low amperes and low line losses.

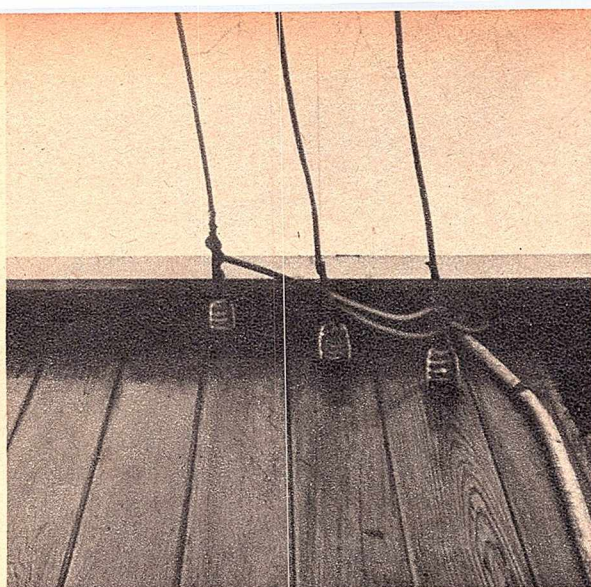
460 Volts?

If 230 volts is an improvement over 115 from the wire standpoint, wouldn't 460 be even more of an improvement over 230? If you think this is mere playing with figures you're wrong, because 460 volts is just what the power companies are putting into many new office buildings that feature extensive air conditioning and large banks of fluorescent lights.

Individual window-type air conditioners for home use usually run to one-half or three-quarter horsepower ratings and they can usually be accommodated on an existing 115-volt circuit or on an added 230-volt line. However, central air-conditioning systems, the smallest of which are rated at two hp, definitely require heavy-duty lines independent of those feeding the rest of the house. A minimum 230-volt service directly from the meter is used.

Three-Phase Current

In many new residential areas where new power lines are to be installed the utility companies are tackling the air-



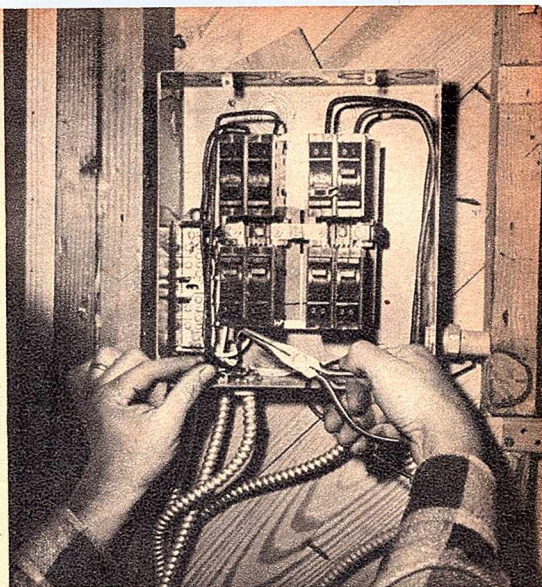
TWO "HOT" WIRES transmit 120 volts each; third wire is neutral. To reduce a 240-volt line to 120, one "hot" wire is used.

conditioning problem from a different angle by furnishing energy hitherto used only for heavy industrial purposes. This is called "three-phase" power and its mark of identification is a *four-wire* cable leading to the house.

Ordinary alternating current is known as single phase at 60 cycles per second. This means that current starts from zero, builds up in one direction to a certain maximum value, drops back to zero, and then repeats the same action in the opposite direction; hence the name *alternating*. Each current build-up takes $1/120$ of a second and each complete back-and-forth cycle or phase, $1/60$ of a second; hence the stated frequency of 60 cycles per second.

In a three-phase system, three identical such cycles of power are introduced a fraction of a second apart, so that during any $1/60$ -of-a-second phase portions of all three are providing energy at the same time. Motors designed for use on three-phase energy are generally more efficient and smoother in operation because they receive three times as many power "kicks" per unit of running time.

The voltage distribution in a four-wire, three-phase line is quite different from that in the older three-wire systems. For the usual "low-voltage" requirements of the household, circuits made between the neutral ground wire and any one of the three "phase" wires



CIRCUIT-BREAKER BOX has 15, 20 and 50 amp circuits with equal voltage. The circuits use No. 14, 12, and 10 wires respectively.

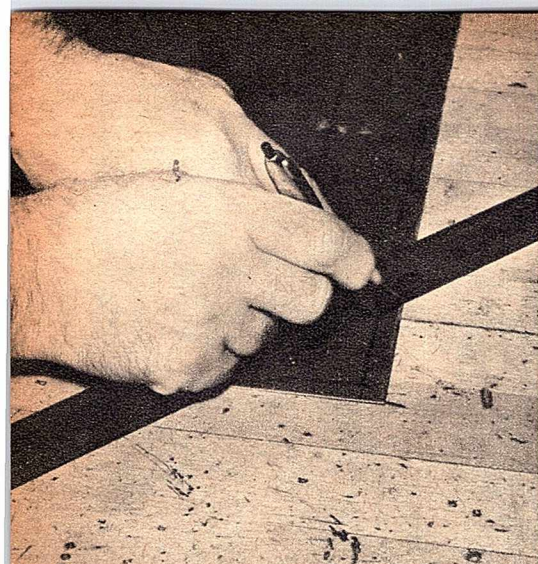
provide single-phase, 120-volt outlets. This is a full 120 volts, not 110, 115 or 117.

In this case, the air conditioner is connected separately by three wires to the three phase wires *without* the neutral. The voltage developed between any two of the phase wires is 208, not 220, 230 or 240. The air conditioner and the house circuits in this split arrangement work without mutual interference. When the conditioner starts up, the house lights don't even flicker.

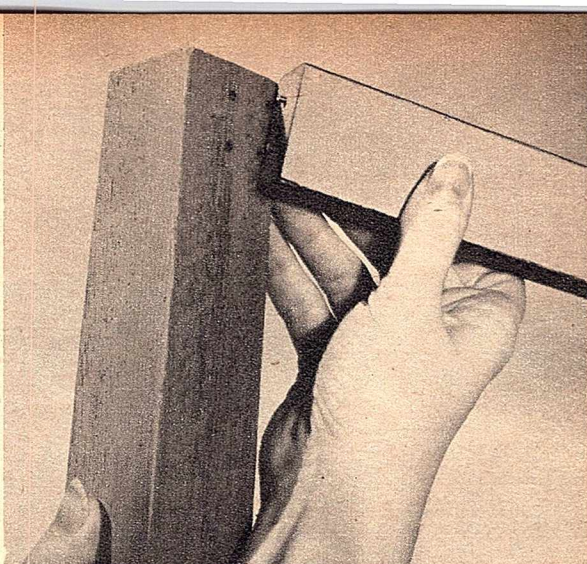
12-Volt Batteries

With a different scale of voltage and amperage figures, the same problem of high-current loss in connecting wires arises in automobiles. Until recently, a three-cell storage battery (nominally six volts but actually 6.6) and a 30-amp generator developing about 180 watts were adequate for the normal running requirements of ignition, lights, radio, etc. However, with the increased use of electrically-operated appurtenances, the load could easily add up to 50 or 60 amps, or about 300 to 360 watts.

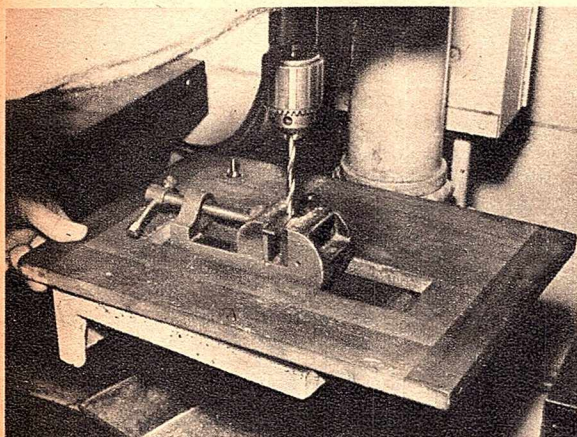
A simple change to a six-cell battery (referred to as 12 volts, but really 13.2), and an accompanying 30- or 35-amp generator doubles the output without increasing wire sizes. This technique is carried even further in some commercial vehicles which use 24- and 48-volt systems. •



BALL POINT PEN may be used as a scriber when laying out sheet metal. The line is easy to see but doesn't scratch the metal.



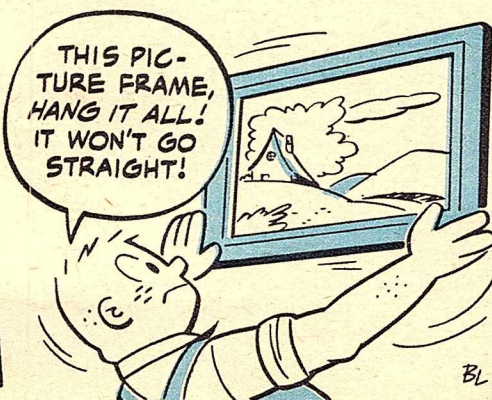
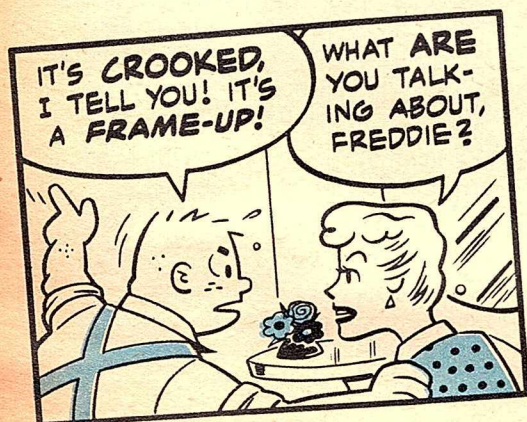
NAIL STUDS can be used as dowel centers. After nails are driven, clip off heads to mark work; then remove stubs with claw.

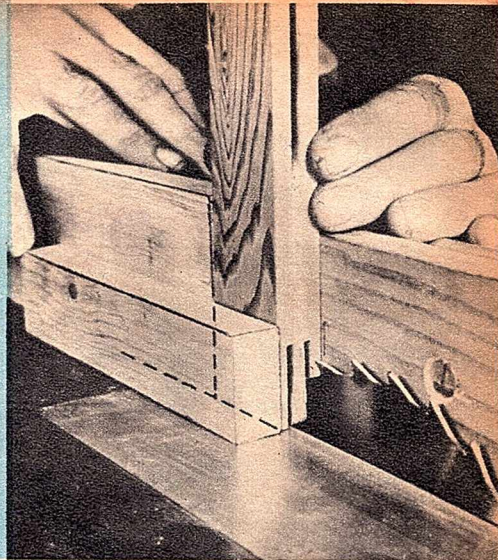
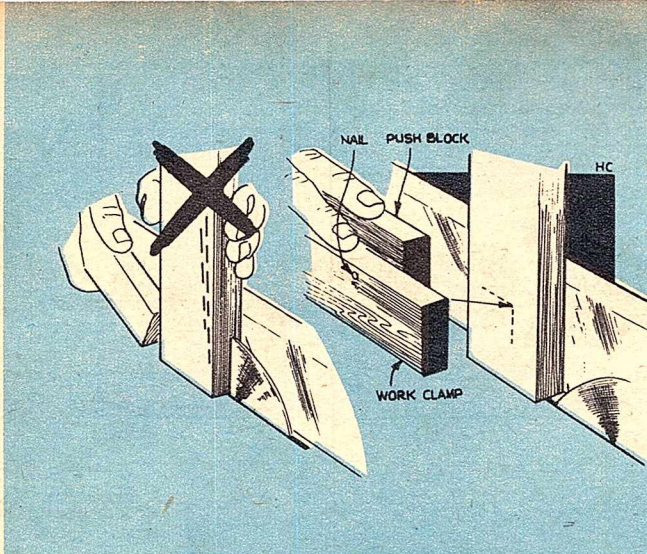


HOME AND SHOP TIPS

SLOTTED BOARD connects to one corner of bench allowing drill press vise to be moved in all directions.

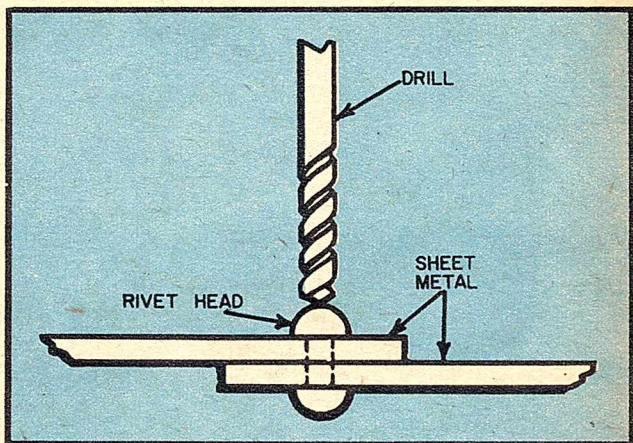
FREDDIE FUMBLES



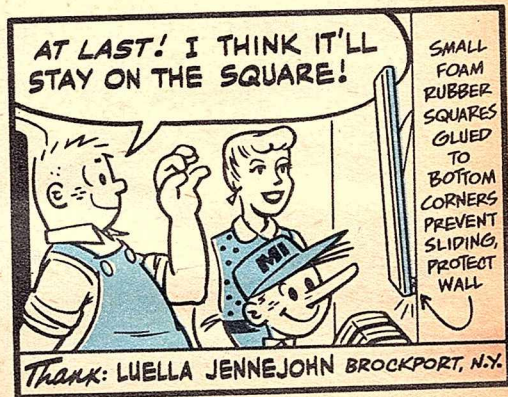


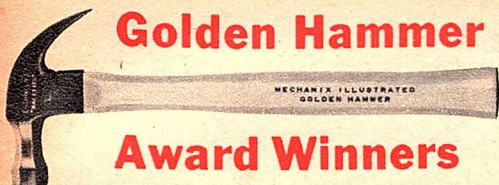
EMERGENCY TENON JIG permits duplication of end cuts in boards by a guide strip nailed to stock the same size as that to be cut.

DRILL OUT RIVETS to preserve usable sheet metal. Center-punch rivet head, then bore rivet with larger diameter bit.



Send Freddie Fumbles your idea of a good short-cut, time-saver or safety device in your work, whether it be in the home, shop, office or farm. Each tip accepted will be paid for at the rate of \$10. Naturally we cannot acknowledge or return the ones we cannot use. However all will be carefully read and evaluated. (Those which we can use in other departments of MI will be paid for at our regular rates.) Please send in your ideas on a post card only. Address to Freddie Fumbles, *Mechanix Illustrated*, 67 W. 44th St., New York 36, N. Y.





Golden Hammer

Award Winners

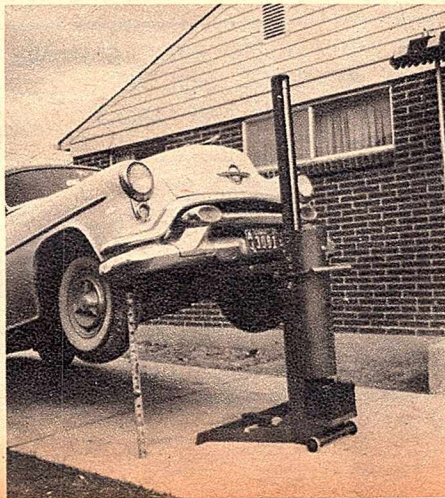
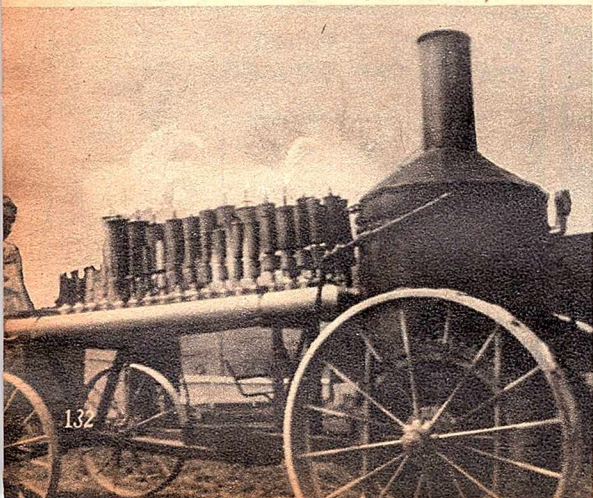
HI-FI CONSOLE was constructed by Carl Rudolph of Chicago. Components include University speaker, Heathkit amplifier.



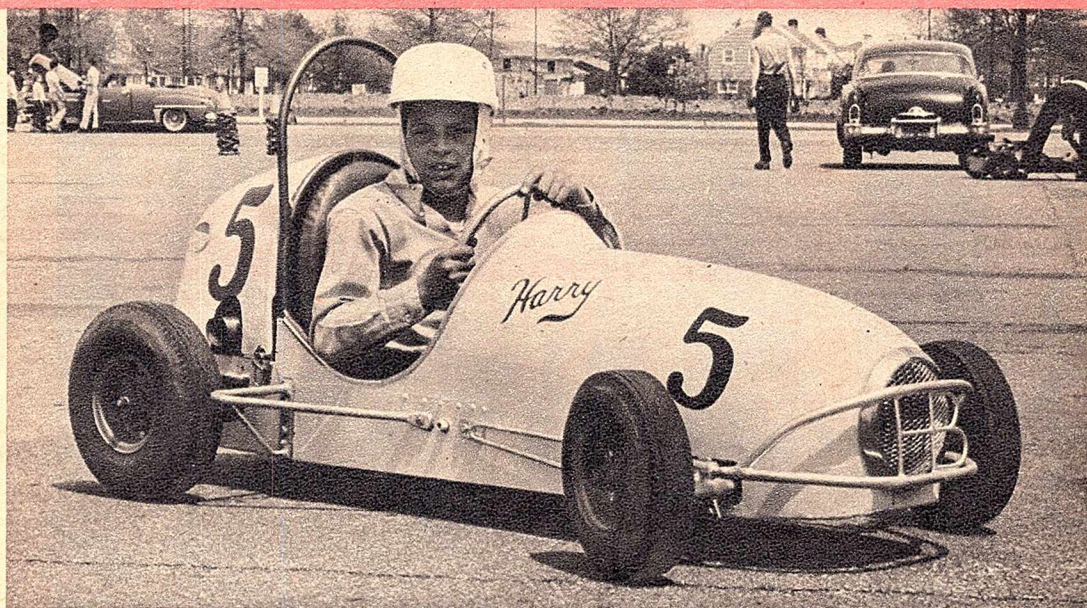
Each craftsman whose project is shown has received a 24-karat gold-plated Hammer and a Workbench Award Certificate. How about sending us a *black-and-white* photo and *full* description of your latest project? If you aren't a winner you may still receive as runner-up prize a 14-karat gold-plated Golden Hammer Tie Bar or MI's Certificate Of Merit. Photos of you and your workshop are also eligible. Send entries to **MECHANIX ILLUSTRATED Golden Hammer Awards**, 67 West 44th St., New York 36, N.Y. If you want entries returned, please enclose postage. Entries cannot be acknowledged.

STEAM CALLIOPE took L. K. Wood of Mendon, Utah, five years of spare-time labor to complete. Note steam shooting from pipes.

HYDRAULIC JACK by Lynn Denison of Spanish Fork, Utah, was made from car parts. Starting motor with battery is power unit.

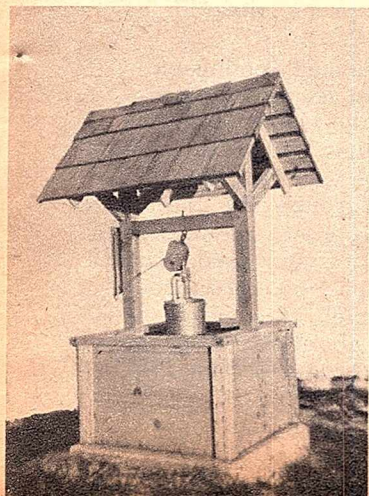


The following craftsmen have been awarded **GOLDEN HAMMER TIE BARS** for their projects:
 Tom Long, Newton, N. C. . . . William L. Medders, Decatur, Ala. . . . Edwin E. Finkbeiner, Burbank, Calif. . . . William Lundh, Seattle, Wash. . . . Michael E. McGuinn, III, Warwick, Va. . . . Frank L. Zlock, Spanaway, Wash. . . . Waldo A. Johnson, Portland, Ore. . . . H. G. Miley, Canton, Ohio . . . Frank H. Peppers, Rosedale, N. Y. . . . F. A. W. Deal, Sarbiton, Sarrey, Eng. . . . Steve Mogelnicki, St. Louis, Mo. . . . Carl W. Salminen, Swartz Creek, Mich. . . . Ted Tyler, Los Angeles, Calif. . . . Arthur M. Teitgen, Manitowoc, Wis. . . . Stanley Jones, Miami, Fla. . . . Fred Leske, Bronx, N. Y. . . . Charles H. Haws, Fort Worth, Tex. . . . W. R. Parker, St. Louis, Mo. . . . Bruce A. Kennedy, Toronto, Can. . . . Ray L. Cooke, Lincoln Park, Mich. . . . Edwin B. Swan and [Continued on page 165]

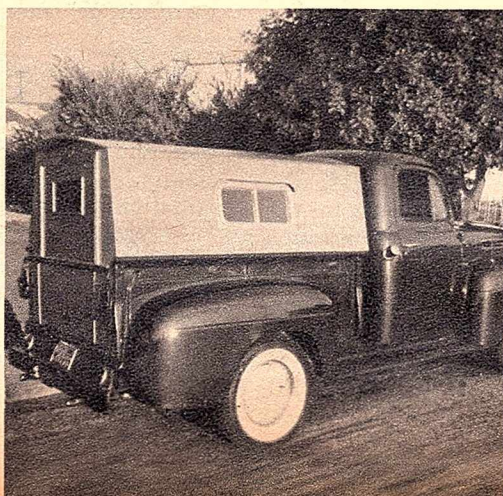


MIDGET RACER is powered by a 2½-hp Continental engine.
 Harry Brunnhoelzl, Oceanside, N.Y., built it in 6 weeks.

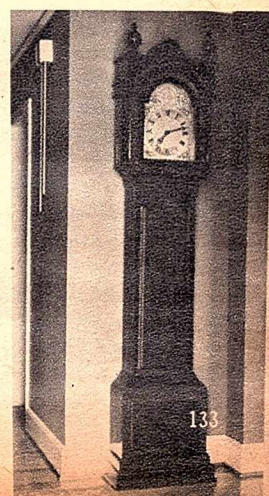
WISHING WELL covers a real 60-ft. well, cost Whitie Gray of Shelbyville, Ky., just \$26.



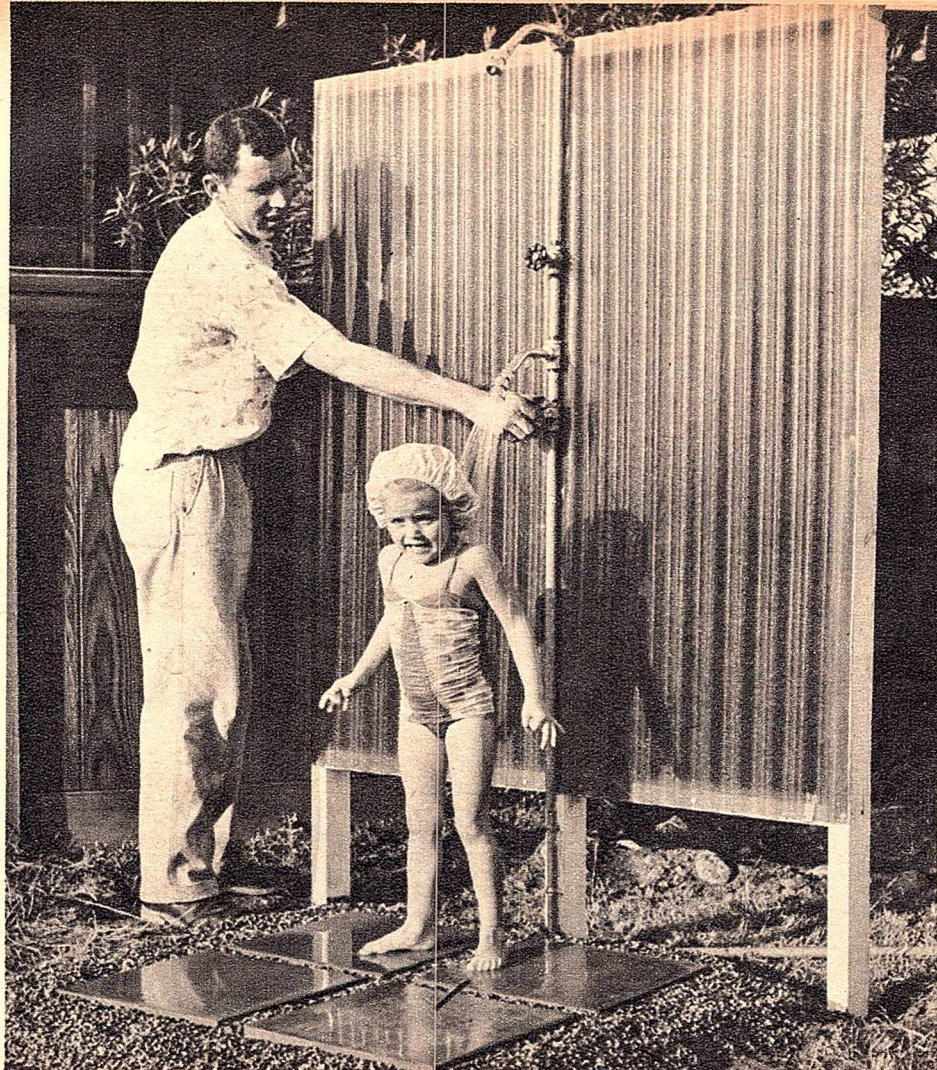
CAMPING CABIN on a pick-up truck is work of Robert Sturgis, Redondo Beach, Calif.



GRANDFATHER CLOCK of mahogany and brass by Coleman Courtney, Sumter, S. C.



OUTDOOR



SHOWER

*Make your own "summer showers"
—using few dollars and fewer hours.*

By V. Lee Oertle

ATENTION gardeners, ball players, swimmers—and especially you kids! Here's a backyard shower Dad can put together in a single afternoon for the benefit and delight of all. Mom will praise the new leisure it affords her by keeping summer grime outside the house instead of in the living room, the kids will suddenly discover how much fun a shower can be, and backyard sun bathing will earn a new popularity when it's so easy to step across the lawn for a cold-water drenching. It's easy to make and this is how it's done:

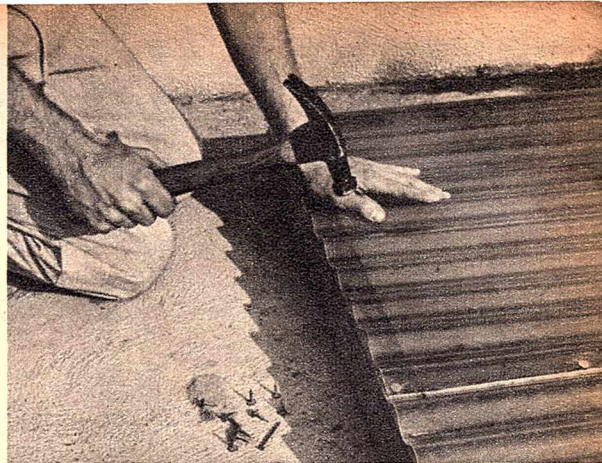
The first step is to build the frame. Nail three 8-foot, and two 52-inch 2x4's together as shown in the diagram at right.

Next, using galvanized roofing nails secure the two 5-foot sections of corrugated Fiberglas to the frame. To avoid damaging the Fiberglas, be sure to drive the nails through the valleys of the corrugations and not through the humps.

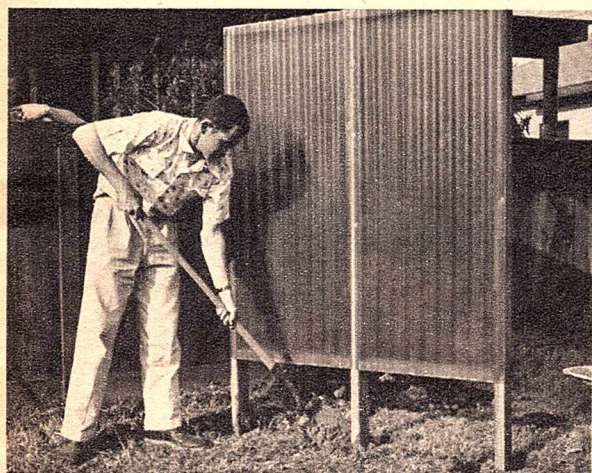
For good drainage, erect your shower on the highest point of your yard. Dig three 18-inch-deep post holes 26 inches apart. Mix up a batch of concrete or Sakrete and pour about three inches into each hole. [Continued on page 165]



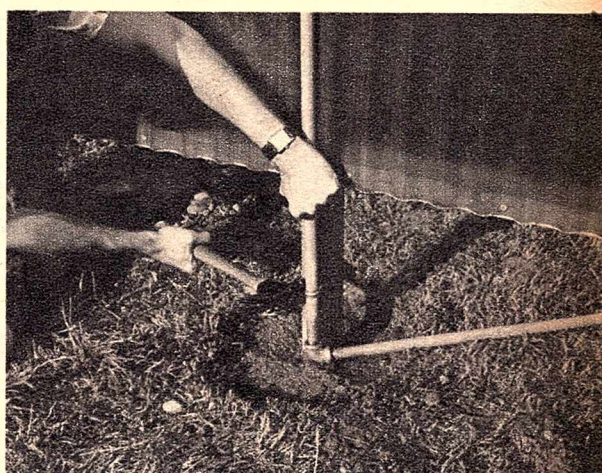
TWO SHEETS of corrugated Fiberglas five feet long, 26 inches wide, fit over frame.



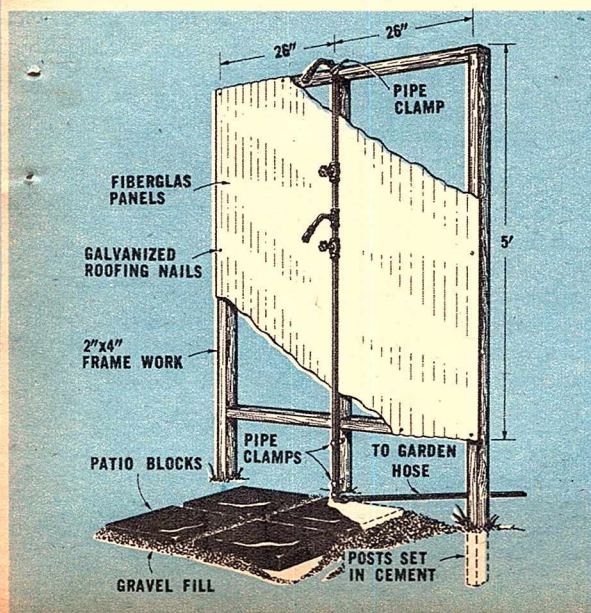
ROOFING NAILS are used to tack on Fiberglas panels. Note spacing between nails.



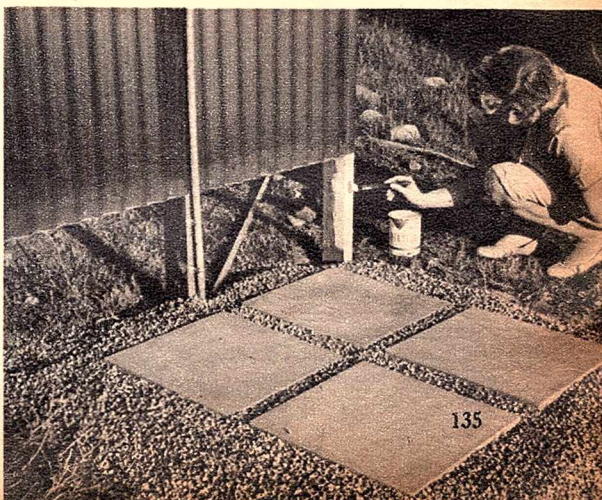
SHOWER PANEL LEGS fit into 18-inch post holes. Holes are then filled with Sakrete.

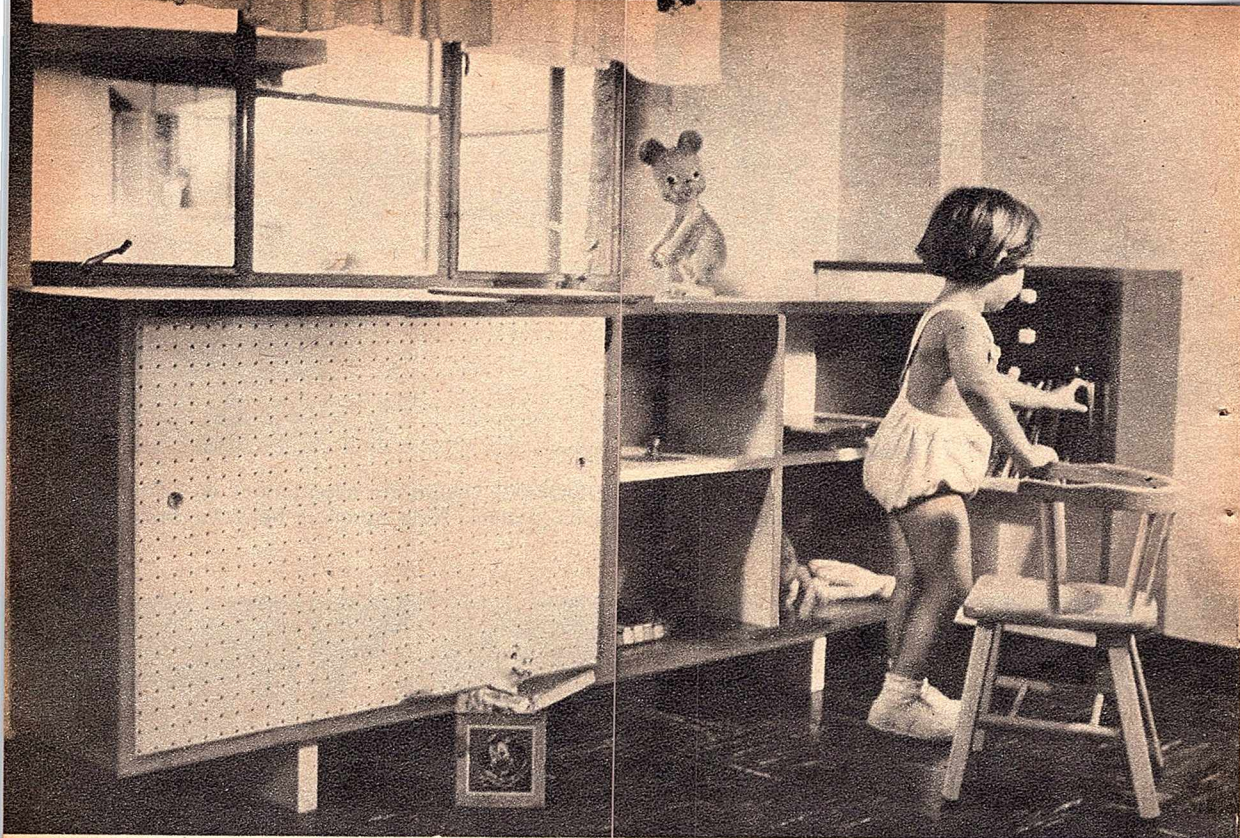


USE PIPE CLAMPS to secure pipe to center 2x4. Horizontal pipe leads to garden hose.



PATIO BLOCKS set in pea gravel facilitate drainage. Use waterproof paint on frame.





Child's Storage Unit

Teach your youngster to store his books and toys in his own cabinet.

By Robert Lasson

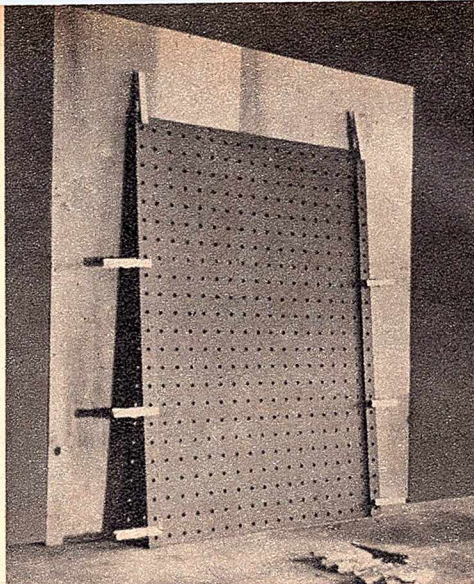
CONSISTING of two easily constructed units, this toy cabinet-bookcase combination will transform the cluttered nursery into a neat, orderly room. And, giving your growing child two commodious pieces of furniture for his very own helps develop a feeling of independence and self-reliance; getting to put things away in their proper place becomes a joy rather than a chore.

The frame and shelves of the sliding door toy cabinet are made of 1x12-in. knot-free white pine. The unit shown is 60 inches long. Overall height (with base) is 29 inches. This was dictated by the height of the window sill in the room, which it meets exactly. Although you may not have exactly the same

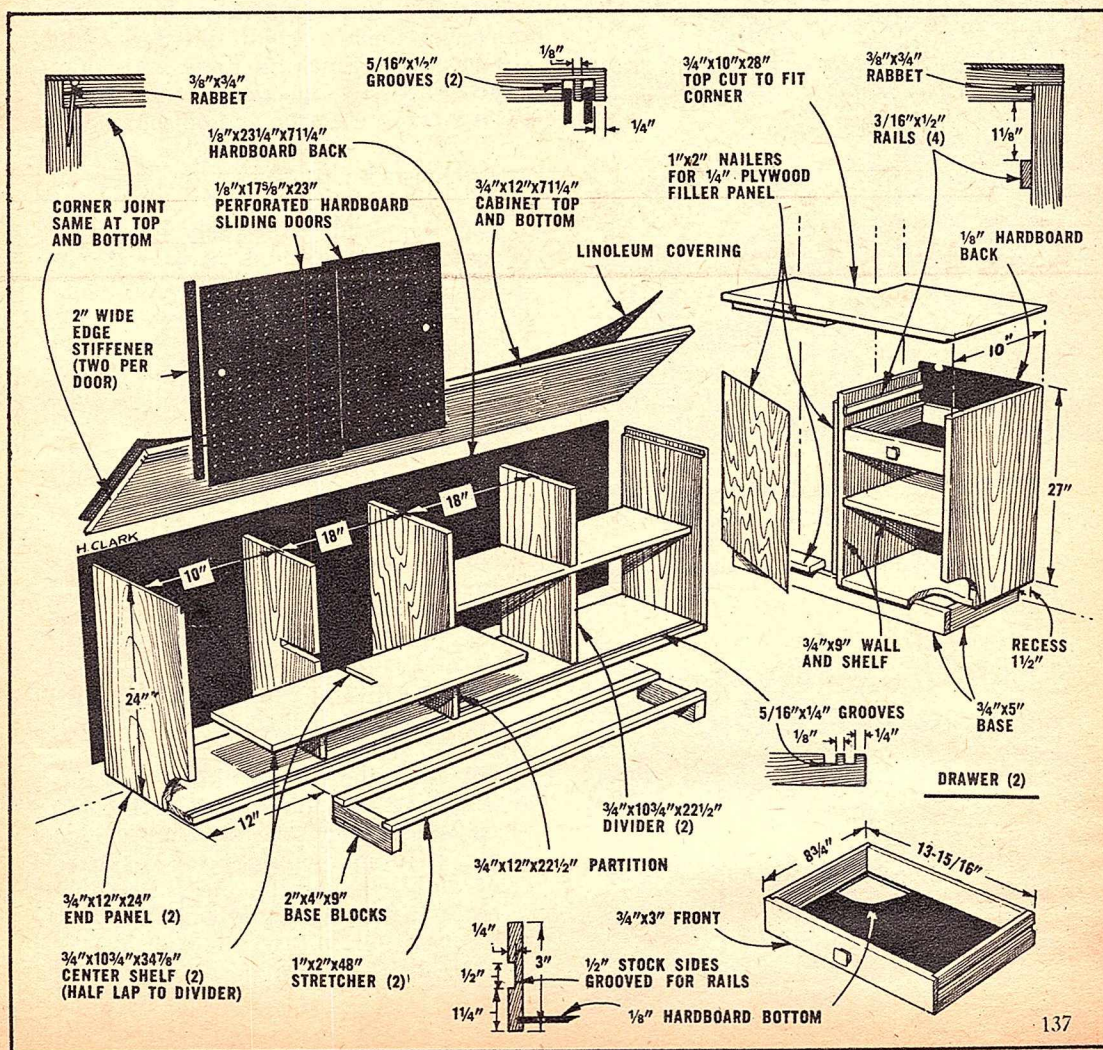


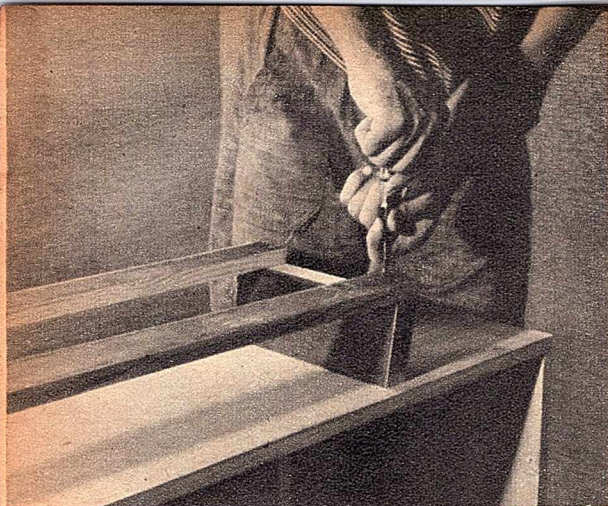
FRAME is assembled with finishing nails and glue. Top is covered with linoleum.

Since the sliding doors will be added

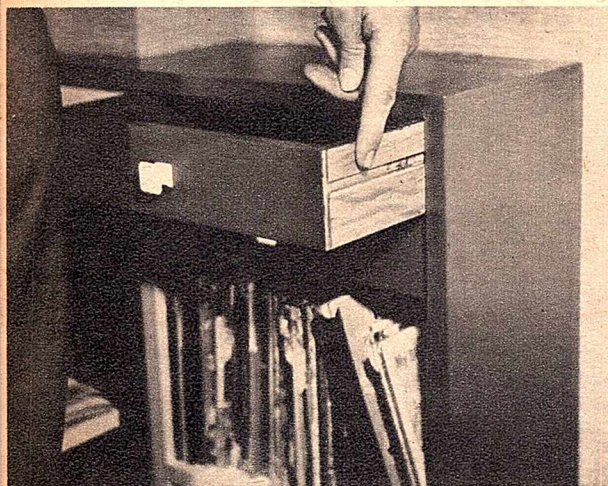


CLOTHESPINs are used to hold reinforcing strips to hardboard while glue is drying.





THE 48-inch long base is glued and nailed to bottom. Tapered front edge is optional.



DRAWER grooves are hidden by overlapping front panel. Bottoms are hardboard.

THE end bookcase should be slightly higher than the toy chest for better appearance.



after assembly, it is necessary to cut the grooves deeper in the top so that the doors can be lifted, positioned and dropped in place. The top grooves are therefore $\frac{5}{16}$ -in. x $\frac{1}{2}$ -in. deep; the bottom grooves are $\frac{5}{16}$ -in. wide by $\frac{1}{4}$ -in. deep.

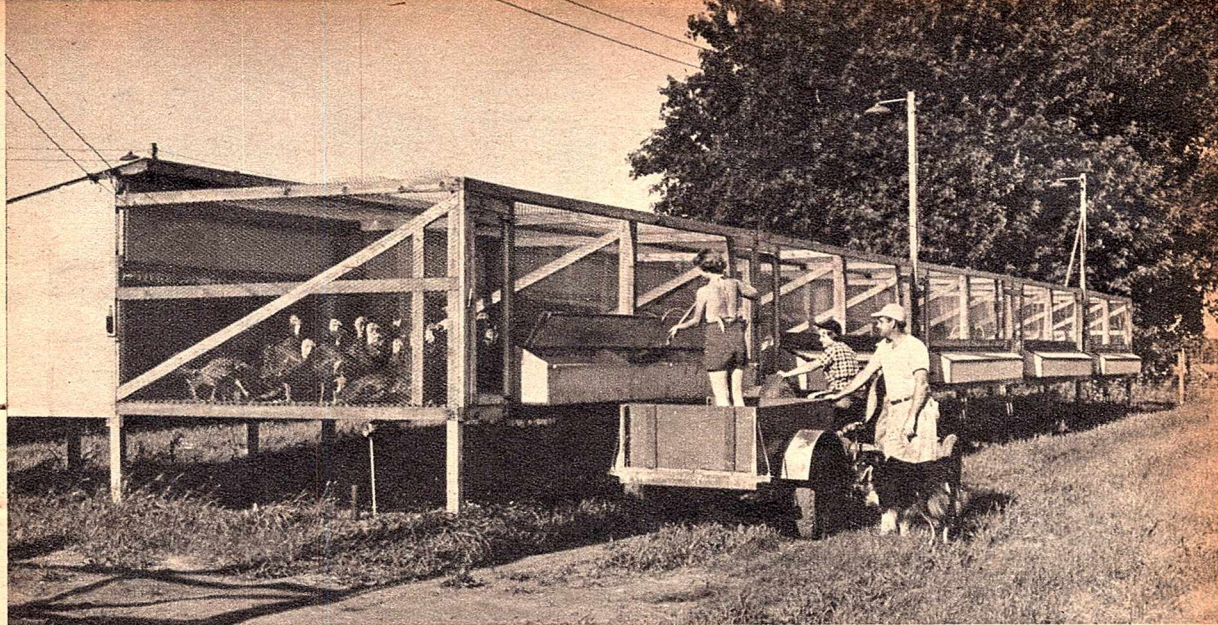
Notice that although the grooves extend across the front of the entire cabinet only two doors are actually in use. It was decided to leave the right half of the cabinet open for easy access to those toys that are used most often. Later on, when the child grows older and needs more enclosed cabinet space, another set of doors will be made and inserted in place. In fact, the design of this unit is so useful and simple that it could be used by the child from kindergarten to college.

Assemble the basic framework: top, sides, bottom, upright dividers and shelves with finishing nails and glue. Note that only the center divider is flush in front with top and bottom members; the other two uprights are recessed in order to permit the doors to slide.

The long shelf is actually composed of two pieces. One is butt-nailed in place. The other, if placed on the same level, must be toe-nailed at the center upright. (If desired, one side of the cabinet may be used for an adjustable shelf with the use of metal shelf supports.)

Cut your hardboard back to size and nail it into the rabbets previously cut. For further rigidity, nail it also into the three uprights. The doors are cut from $\frac{1}{8}$ -inch perforated hardboard. Each is $17\frac{3}{8}$ inches wide, reinforced at both edges with 2-in. strips of the same material. The strips are merely glued in place and held with ordinary clip-type clothespins until dry. Brass finger cups are inserted, as indicated in the drawing.

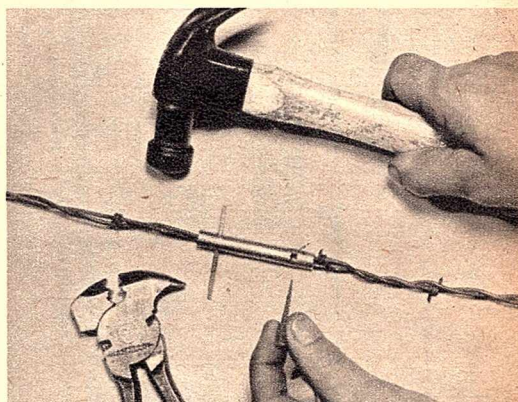
Cut your linoleum so that it extends slightly over all four edges of the top piece. When the adhesive recommended by the linoleum manufacturer has dried completely, sand off the excess linoleum to make it flush with the wood. If you did a good job, you will not be able to discern the [Continued on page 164]



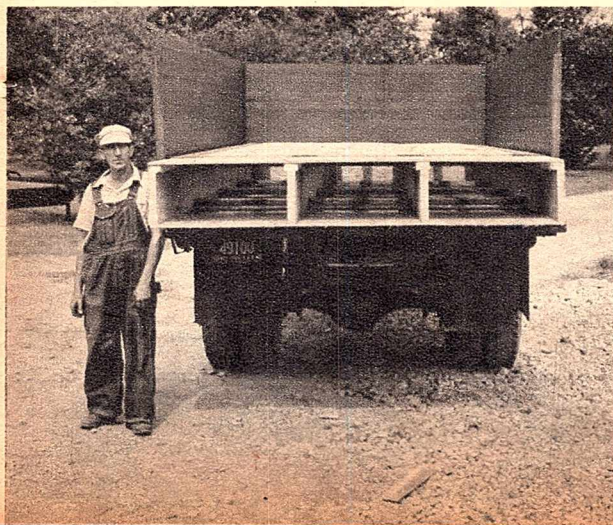
TURKEY PENS with outside feeding bins simplify care of 4,000 birds on this farm.

FARM and GARDEN KINKS

CONNECTOR splices or takes up slack in barbed wire fence; pins wedge wire inside. Rochester Supply, Rochester, Minn.



GRAIN DRIER fits truck bed, has screen top. End panel (removed for clarity) has a duct through which heated air is blown.



RUST PREVENTER for small garden tools is a large garbage can one-third full of sharp sand moistened with crankcase oil.



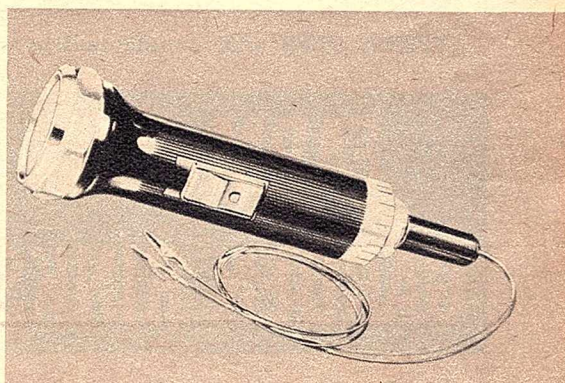
MI's

Hardware Store



FLOOR POLISHING attachment for lady of the house fits power unit of husband's Dyno-Mite Power Workshop; price, \$29.95.

Millers Falls Co., Greenfield, Mass.



FLASHLIGHT accepts jack for continuity testing, lights if there is a continuous circuit, can be used separately; \$6.75.

Ray-O-Vac Co., Madison 10, Wis.

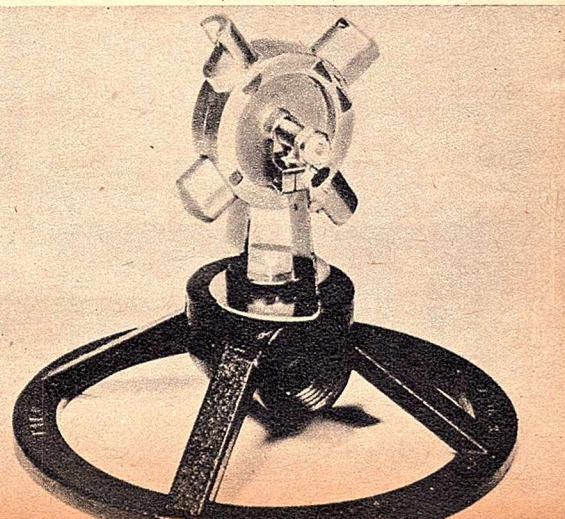


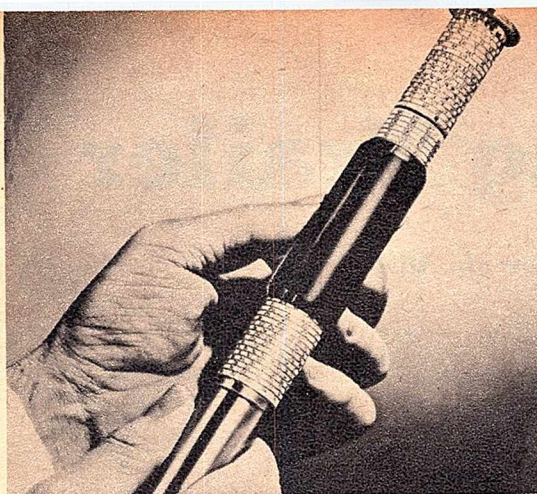
SHELVING is steel with black, baked-on enamel finish, comes in different sizes; unit above, 6 ft. x 3 ft. x 12 in., costs \$9.95.

Hirsch Mfg. Co., 8051 Central Park Ave., Skokie, Ill.

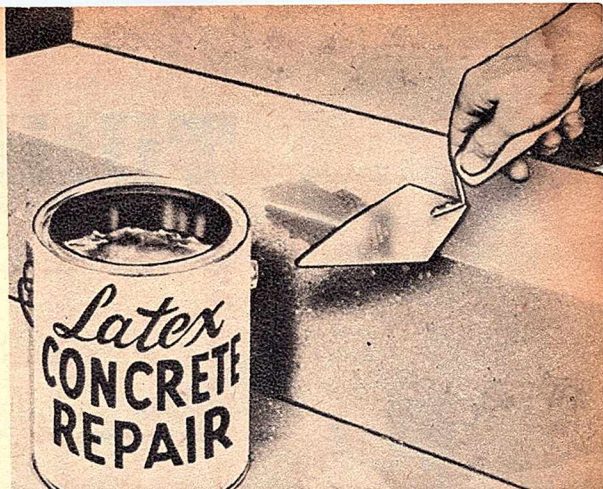
LAWN SPRINKLER adjusts to spray either a 30-ft. square, a 4x40-ft. rectangle, a quarter or a half circle; \$5.75, postpaid.

E. D. Bicker, 422 N. E. 32nd St., Miami 37, Fla.





SLIDE RULE is cylindrical, has graduations equal to those on a 66-in. rule; it telescopes to 6x1¼ in.; \$19.95, postpaid. A. F. Smith Co., 311 Alexander St., Rochester, N. Y.

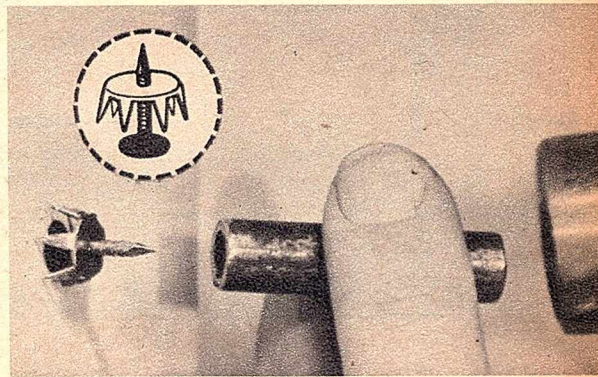


CONCRETE repairs up to 1 in. thick can be made with new compound; it bonds without primer, is self-curing, weatherproof. Latex Concrete Co., 10 W. 70th St., Chicago 21, Ill.



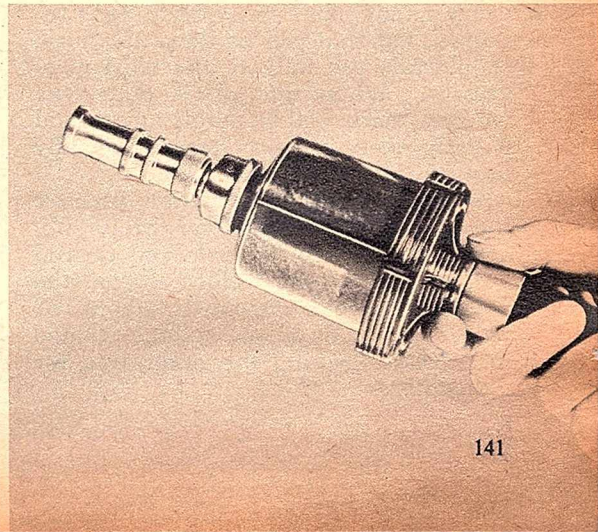
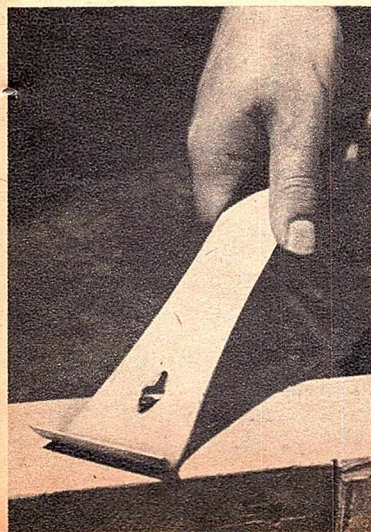
RARE WOOD veneer samples, 50 in number, measure 4x9 in., are 1/28-in. thick, can be used for display or inlays. \$4.75 ppd. A. Constantine & Son, 2050 Eastchester Rd., N. Y. 61.

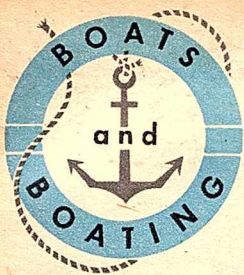
L'L JIMMIE is a handy tool for removing baseboards and moldings; it also has a nail-pulling hole. The price is \$2.80. Red Devil Tools, Union, N. J.



SPIDER FASTENERS, sold with a setting tool, are driven into furring strips with reversed nail, simplify panel installation. Aetna Plywood, 1735 N. Elston Ave., Chicago 22.

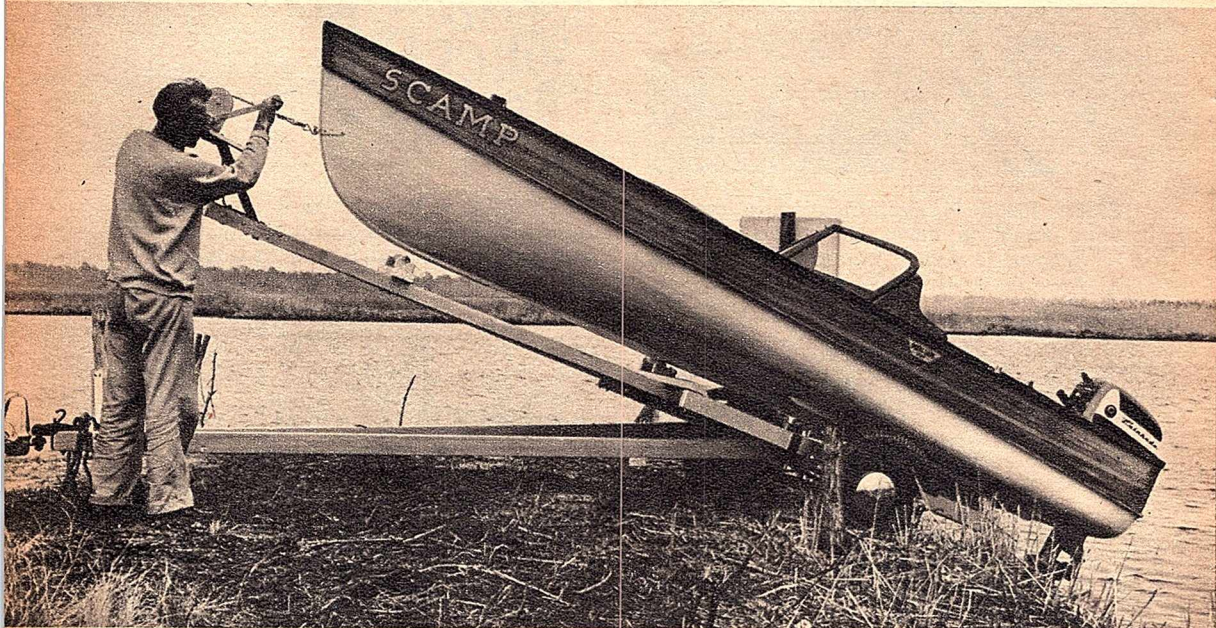
GARDEN HOSE attachment holds insecticide, fertilizer and weed killer pellets which mix with water at controlled rate. Leeds Chemical Prod. Co., 112 E. Walton St., Chicago.





Tilting Trailer

By Joseph Adams



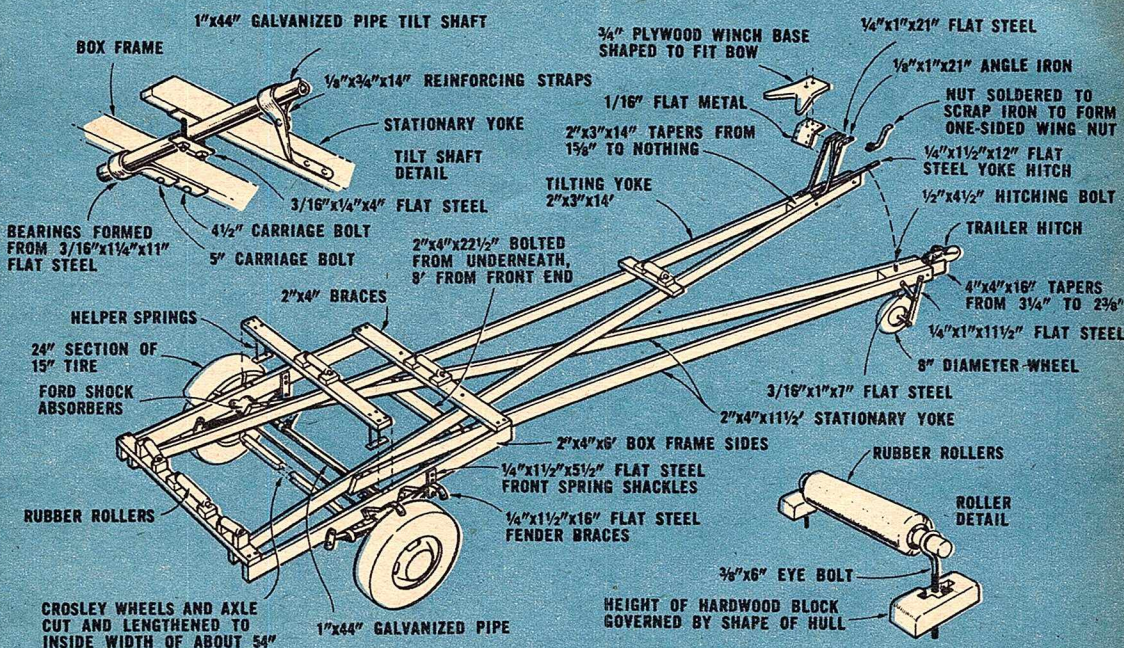
Save trouble and toil by building a trailer that makes it easy to launch and haul out your boat.

FEATUREING a tilting cradle and a winch for easy launching and haul-out, this small boat trailer can be built with tools possessed by practically every handyman. Some welding is required, but that can be done at a local shop while the bulk of the work progresses. When the job is done, the wooden frame will be amply strong and it will even outlast steel, especially around salt water.

Before starting construction, procure the front end of a small car, preferably a Crosley. Have the axle and tie rod cut, pieced out and welded so that the width between wheels is about 54 inches. Also have one spindle welded in position, leaving the other free for adjustment.

While the welding is being done, buy the lumber. Get a good grade of hardwood, such as fir (not spruce). The stock should be clear and straight-grained. Don't take anything with large knots.

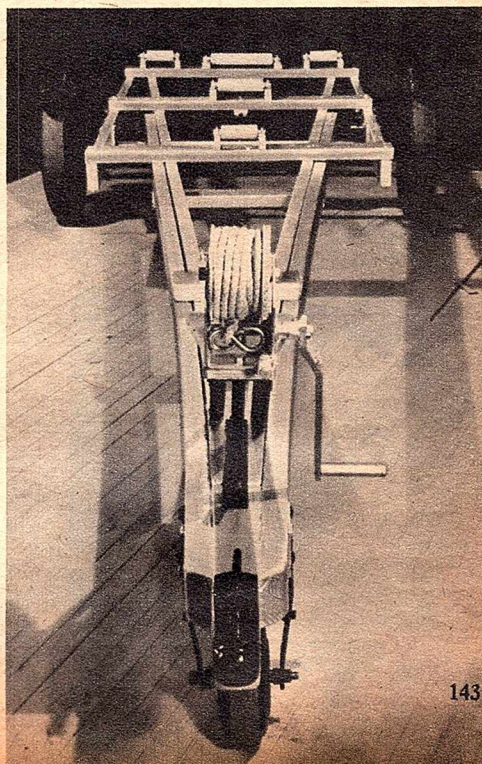
Start construction with the box frame. The sides, as noted in the drawing, are six feet long and the width is determined by the location of the springs on the widened axle. The front spring shackles are fixed and each one is attached with two $\frac{5}{16}$ -inch bolts so that the axle will be at the center of the frame. The rear shackles float in rubber bushings, so bore a large enough hole in each side piece to take the bushing and the bolt. The whole frame can then be assembled with

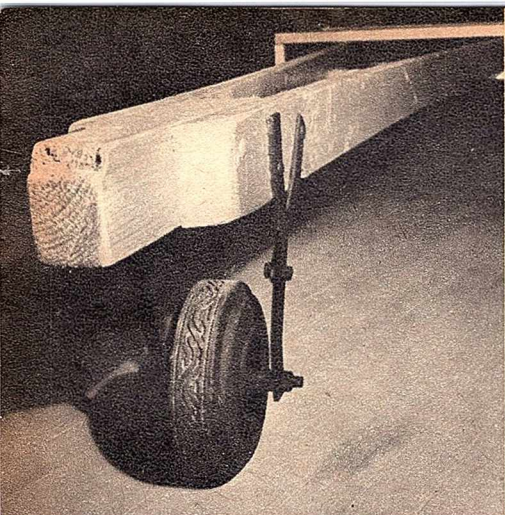


two $\frac{5}{16}$ -inch bolts through each joint.

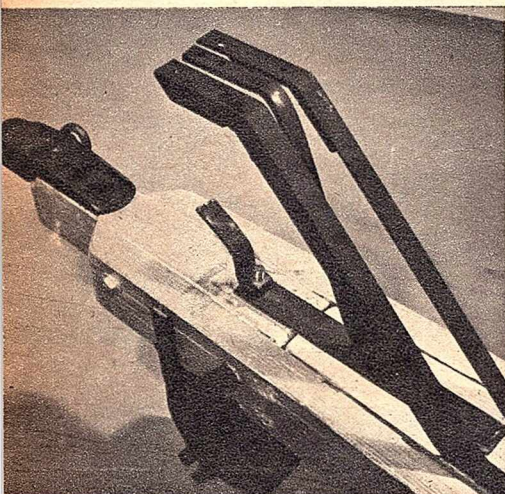
You will note from the drawing that the stationary yoke is the one to which the trailer hitch is attached. The other, which fits inside, is the tilting yoke. To make the stationary yoke, simply attach two 11½-foot 2x4's to the tapered nose piece with three $\frac{3}{8}$ x7½-inch bolts, allowing four inches of the nose piece to project at the front for the trailer hitch. (Two of the bolts will later hold the front wheel assembly.) The yoke is then spread, with a crosspiece on the underside, so that the ends fall five inches inside the box frame. This will leave room to mount the shock absorbers.

The stationary yoke is secured to a one-inch pipe which rotates in strap bearings attached to the undersides of the box frame seven inches in front of the axle. How this is done is clearly detailed in the drawing. To keep the pipe from shifting, place a large washer



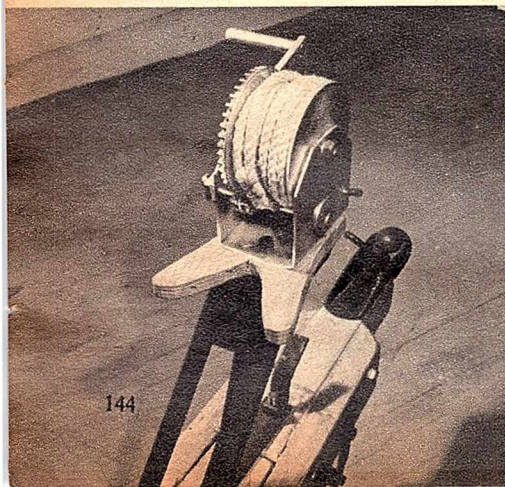


TOP of yoke is raised 14 in. above ground by a wheel of 8-in. diameter.



NUT with welded handle is removed when you have to raise tilting yoke.

PLYWOOD piece, cut to bow contour, is secured between winch and mount.

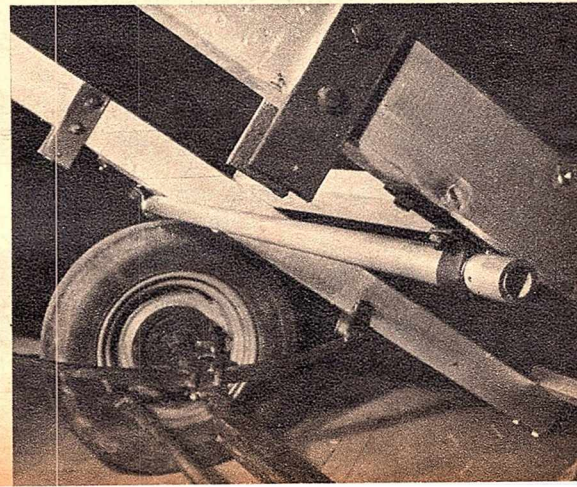


on each end and secure it with a cotter pin as shown in the photo at the top of the last page.

The tilting yoke is made the same way as the stationary yoke except that the nose piece tapers to zero at the front end and both the nuts and heads of three $\frac{5}{16}$ -inch bolts used to attach the sides are countersunk. A crosspiece, which bears a roller, is bolted to the top of this yoke about three feet from the end; it should be wide enough so that the ends rest on the stationary yoke. Also, in attaching the crosspiece, bear in mind that the spread of the yoke should be such that there is a $\frac{1}{8}$ -inch space between the yokes when they are fitted together. (This also applies at the nose.)

The winch mount is attached to the tilting yoke to give maximum direct pull when hauling the boat out of the water. It is made up of two pieces of 21-inch angle iron and one piece of flat steel. Two inches from each end, a V is cut in one side of the angle iron. The ends are then bent down at 45° angles and welded. It is also necessary to cut one side of the angle iron away at the lower end so that you will have a flat base. The two members are secured ten inches from the end of the tilting yoke with two $\frac{5}{16}$ -inch bolts. The center piece of flat steel is bent to rise more abruptly and meet with the outside members. Beneath this center piece, another piece of flat steel is bolted; it extends to hitch the two yokes together and the forward end is secured to a bolt in the stationary yoke with a one-sided wing nut made as illustrated. The top of the mount is reinforced with a piece of flat metal and a $\frac{3}{4}$ -inch piece of plywood extended in a fork to fit the bow of the boat. When the winch mount is installed, the

PIPE to which stationary yoke is fastened turns in two bearings made of flat steel.



tilting yoke can be attached to the undersides of the box frame crosspieces with two $\frac{5}{16}$ -inch bolts at each joint.

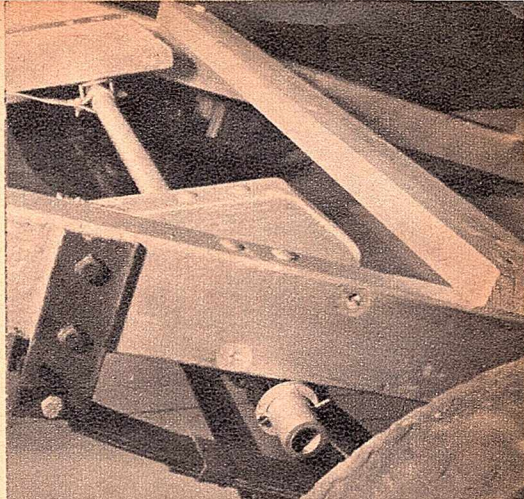
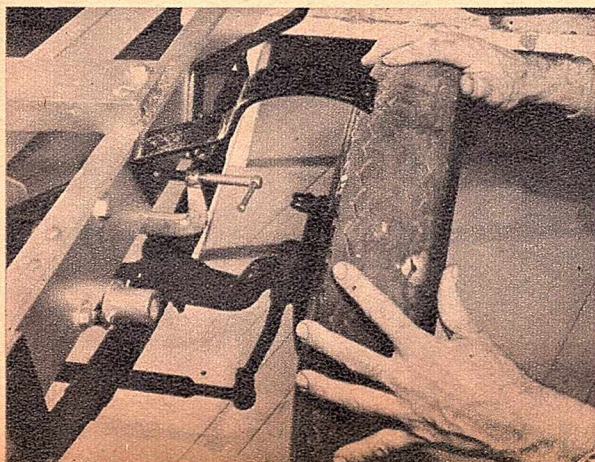
The front wheel, which is attached to the stationary yoke, is a small industrial type, eight inches in diameter. The flat steel supports are drilled to accept two of the bolts through the nose piece. When the installation is complete, the top of the yoke should be 14 inches above the ground.

Six wringer rollers are used on the box frame and tilting yoke. Five of these are cut in half; the center back one is used full width. They are installed as shown in the drawing, with the outside ones tilted to fit the contour of the boat bottom.

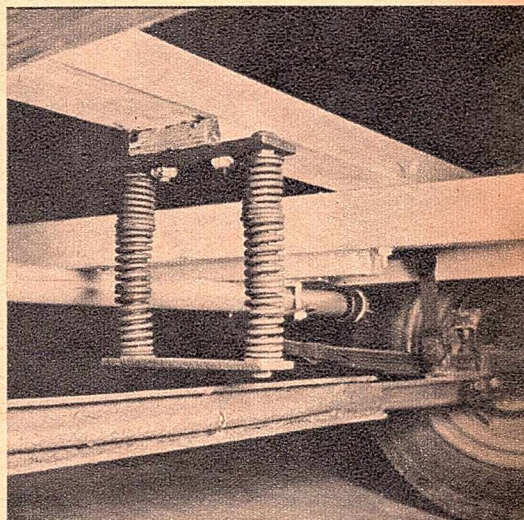
If a Crosley front end is employed, shock absorbers from a Model A Ford will literally fall in place as illustrated. We found the Crosley springs a little light for a heavy, 16-foot runabout loaded down with a 35-hp motor and all the equipment needed for a week end camping and fishing trip. To remedy this, helper springs which bear on the axle were added. They are nothing more than heavy valve springs from a large truck motor slipped over $\frac{7}{16}$ x7-inch bolts and secured with pieces of flat steel. Each assembly is attached to the center cross-piece so that the bottom is about one inch above the axle. For additional compression, light car valve springs can be inserted within the heavy springs.

Fender braces are first fashioned from light metal. Once the shape is determined, they are duplicated in the heavier steel indicated on the drawing. The heavy steel can be bent with a 20-ounce hammer in a large vise without heating or strenuous effort. Clamp the [Continued on page 166]

FENDER SUPPORTS are shown clamped to frame for a check on shape and location.

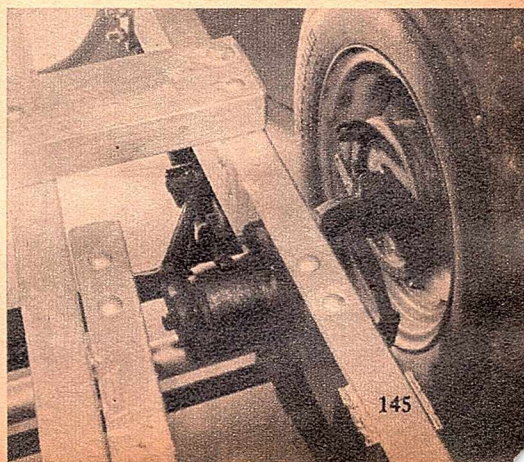


STATIONARY YOKE is fastened to pipe with bolts and steel straps.



HELPER SPRINGS are made of flat steel, truck valve springs and bolts.

SHOCK ABSORBER from Model A Ford fits fine on the Crosley axle.



CAR CARE

THAT BLACK BOX

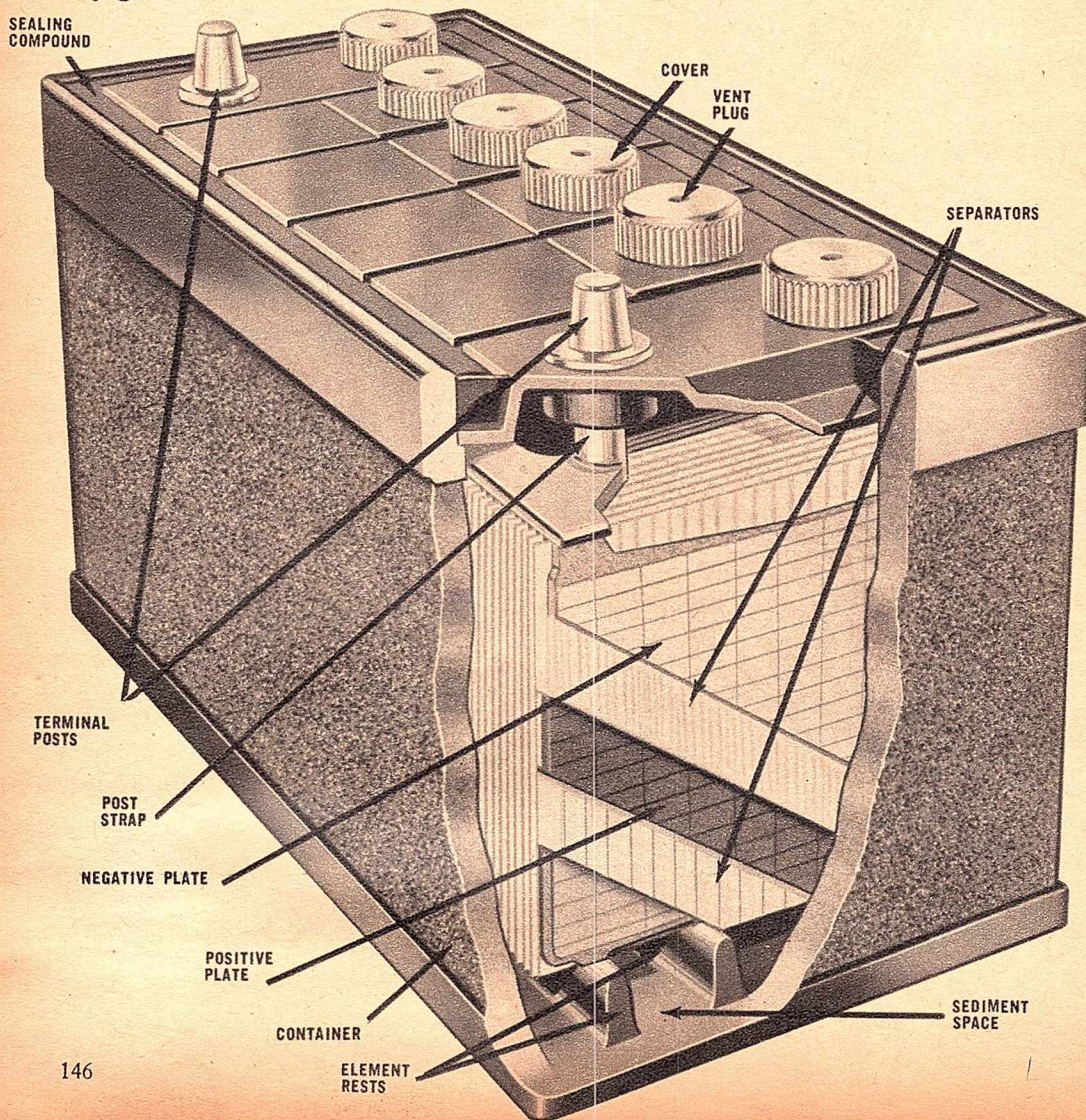
By Frederick C. Russell

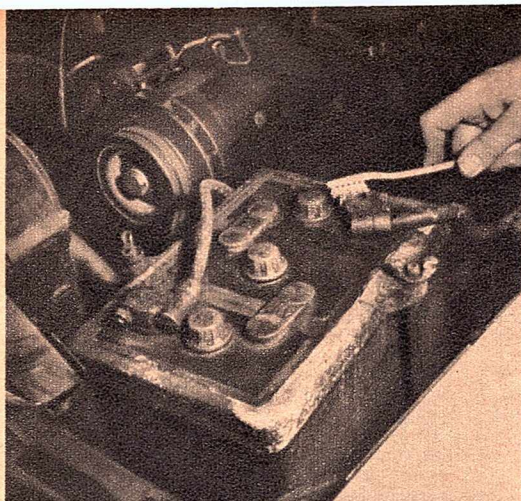
Member, Society of Automotive Engineers

Your storage battery is the heart of your car—give it proper care.

NO car would ever get any place without that very important unit we call the storage battery; yet many people treat it with utter disregard. Once it's installed, they forget about it until trouble develops. Proper battery care really isn't any problem and all drivers would save a lot of headaches if they gave it a little attention.

The most important thing to know about that box under the hood is its state of charge, which is best described as the amount of electrical energy it stores at any one time. If you are constantly aware of this condition, the chances are that you won't have any trouble until the battery normally wears out.



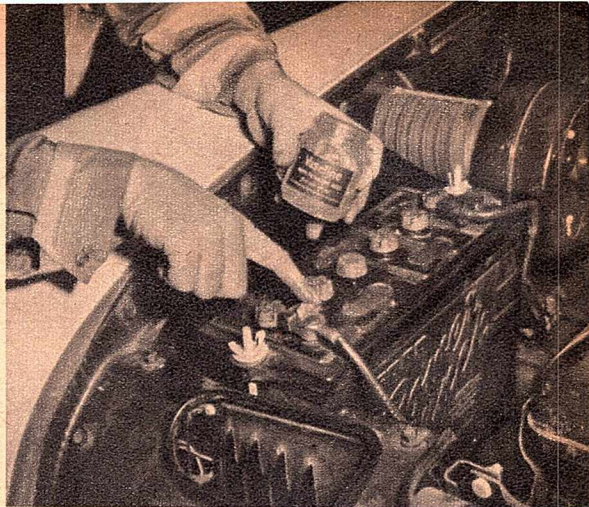


BATTERY TERMINALS which are corroded can be cleaned with a small, stiff brush, using a diluted ammonia or soda solution.

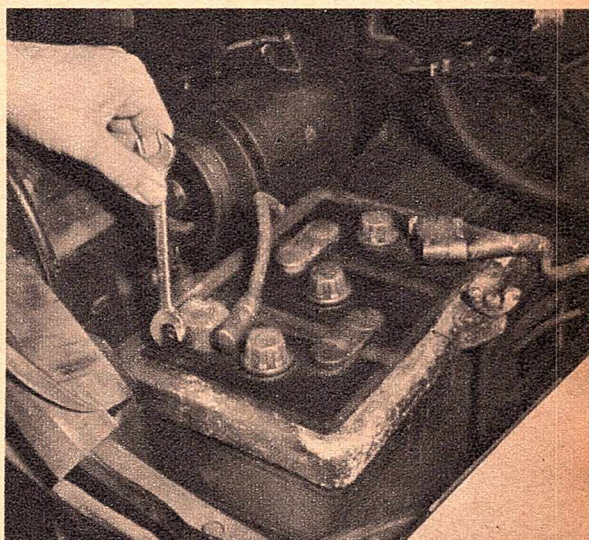
Your car battery doesn't make electricity; that's the generator's job. Current from the generator changes the chemical composition of the battery plates, resulting in electrical energy stored in chemical form. When this energy is drained, the chemical composition again changes. Unless the process is reversed, and balance is maintained, the stored energy is depleted. One good example of what *not* to do is to drive for short distances with the radio, heater and lights in operation. The stored energy goes and there is no chance for proper charging.

The easiest way to keep a running account of your battery's balance is to watch the pointer of the ammeter and know how to interpret its signs. Unfortunately, many late-model cars have a red telltale light which merely serves to indicate that the battery is discharging, as happens when the generator fails or the engine stalls with the ignition on. But even without an ammeter, there are some handy signs to tell you if you are failing to maintain good balance. For instance, you'll know there hasn't been sufficient generator output if cranking speed is lower than normal; if the lights dim when you crank, it is further evidence; skipping in the engine at idling speed is another hint; or missing at low speeds when the engine is pulling tells

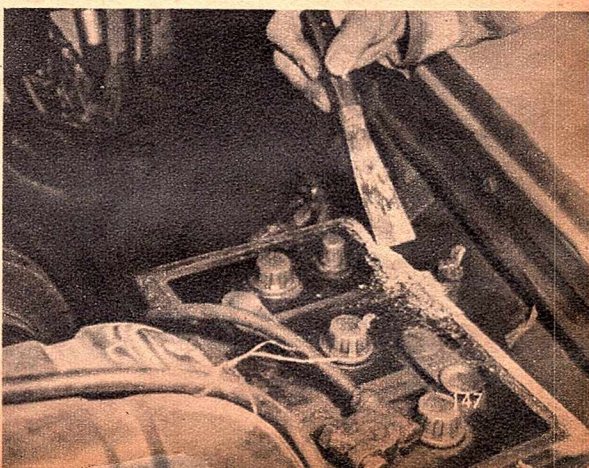
ACID VAPOR will cause other metal parts to corrode; scrape all corrosion from the case and apply touch-up paint as required.



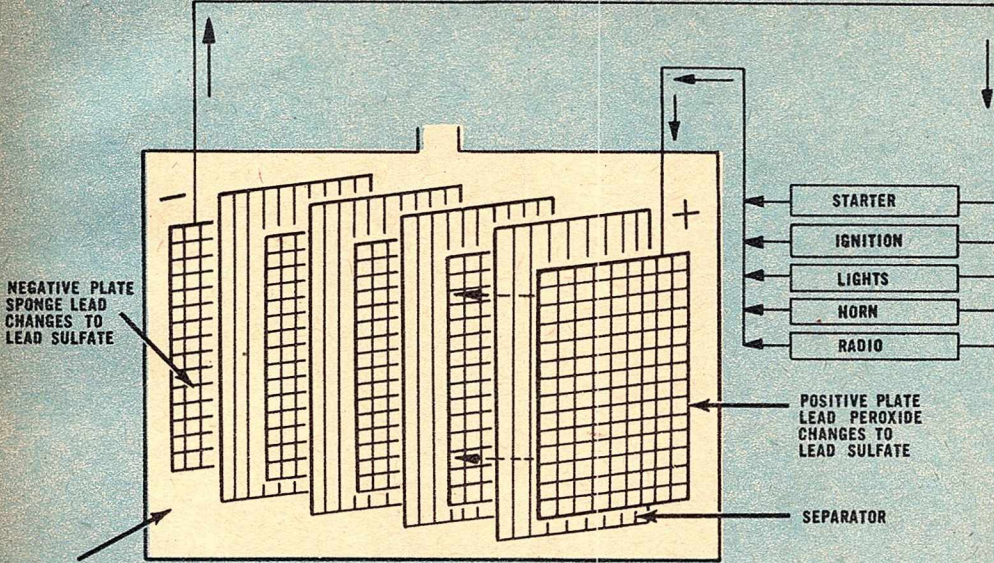
CORROSION is checked by applying light film of Vaseline to posts and connectors; don't put any on the contacting surfaces.



POOR CONTACT is the cause of much battery trouble; be sure that the bolts on the cable clamps are always kept tight.

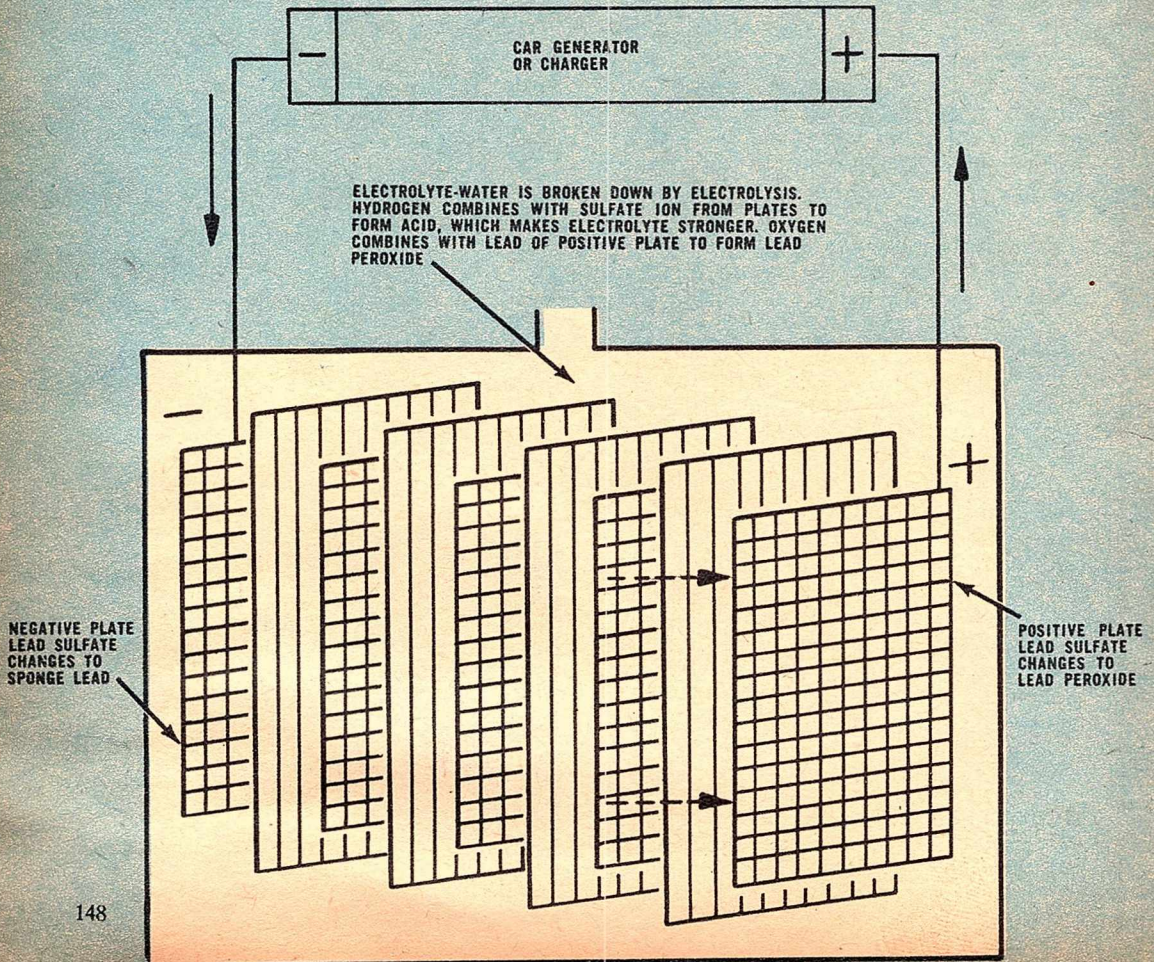


DURING THE DISCHARGE



ELECTROLYTE-SULFATE ION OF SULFURIC ACID UNITES WITH ACTIVE MATERIALS ON PLATES LEAVING WEAKER ACID SOLUTION. HYDROGEN OF ACID AND OXYGEN OF LEAD PEROXIDE COMBINE TO FORM WATER, DILUTING SOLUTION

DURING THE CHARGE



you of battery weakness. An experienced trouble-shooter always looks for a combination of such conditions.

Water should not be added to the cells unless the car is to be used immediately. Otherwise, the water will remain on top until the start of chemical action; in very cold weather it could freeze and possibly damage the battery.

Keep the battery solution level at $\frac{3}{8}$ -inch above the tops of the separators. In cold weather the battery will have more pep if the level is lowered slightly. However, too low a level will cause damage to the separators, so make it a practice to check the level often. On most batteries you will find a marker or some device to help in finding the correct level for normal driving in all but real cold weather.

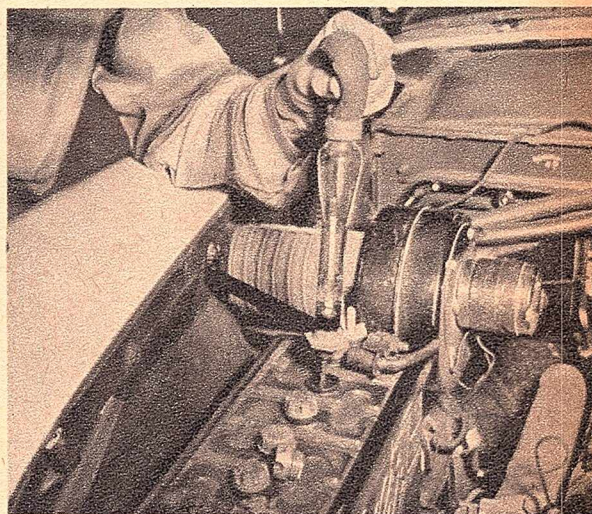
Remember that the increased current output of today's generator can be particularly damaging to a 12-volt system. Leakage of electrolyte should be carefully avoided. You'd hardly guess that this is usually due to over-filling the cells with water as well as to overcharging. Current also is more likely to leak from a 12-volt battery and here's why: Your 12-volt battery has twice the voltage of the six-volt type, but only about half the ampere-hour capacity. Since voltage is pressure, there's a chance of current leaking across the battery top unless it is kept dry and clean. Remember that dirt is an invitation to moisture. It's important also to bear in mind that the lighter wiring in the 12-volt system may burn up faster if a short develops.

Part of the job of keeping the battery in balance is understanding how it wears out. Failure to have the battery recharged when it is in a weakened condition is a sure route to trouble. The same can be said for continuous overcharging such as happens when the generator's regulator needs adjusting. Operation of the car over a long period with the battery in a low state of charge results in what is known as sulphation. This is not to be confused with corrosion of battery [Continued on page 160]

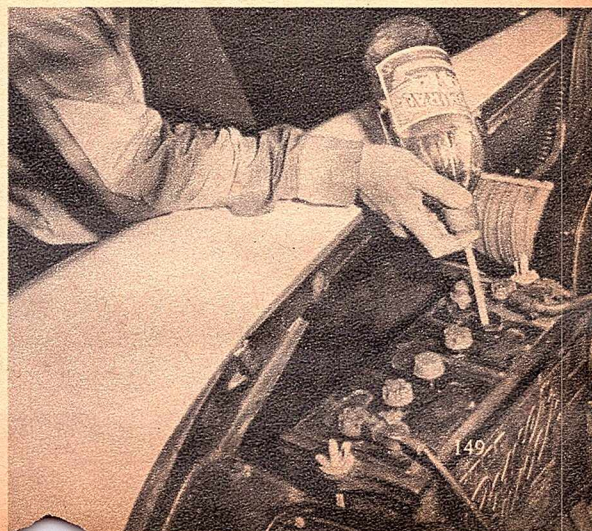
WATER may be added from any bottle with new-type filler; it has an air vent that is capped with a finger to control the flow.

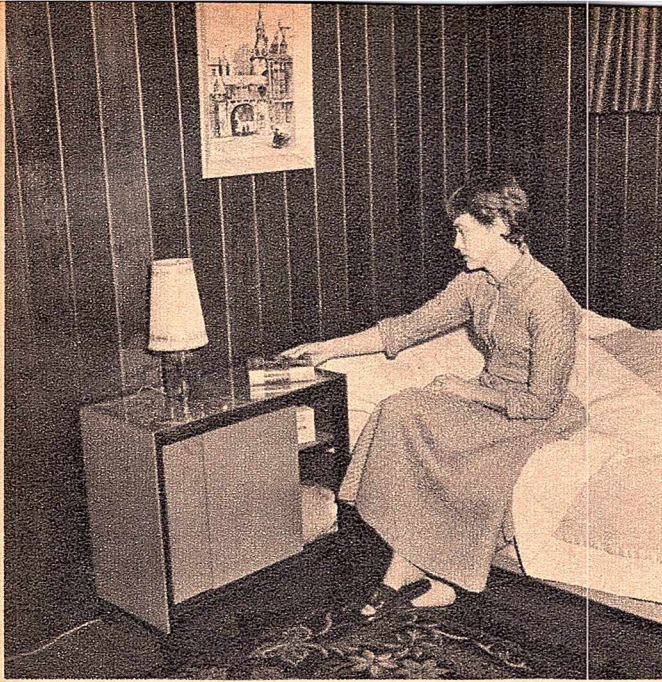


METAL brackets and battery case must be kept painted with a high-grade enamel in order to keep them from rusting through.



HYDROMETER is held in a vertical position when checking specific gravity; this keeps the float from sticking in the tube.





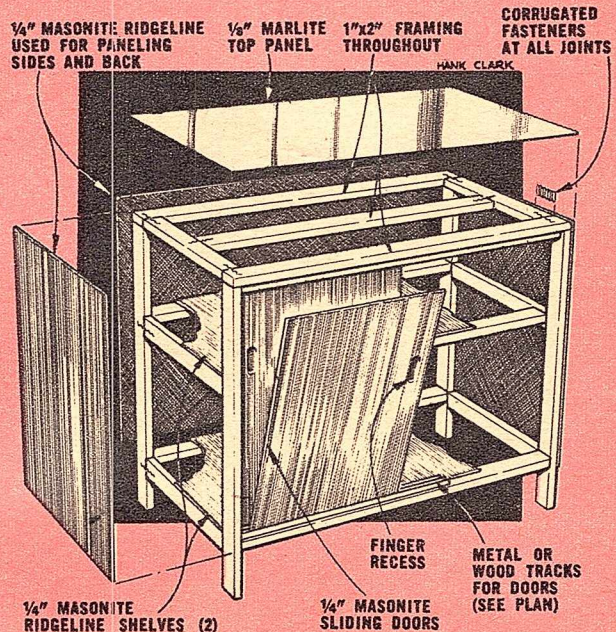
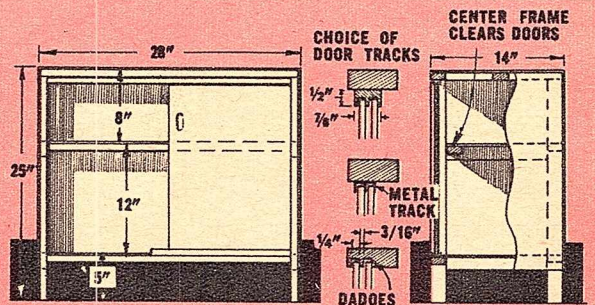
BEDSIDE BUTLER

SLIDING DOORS conceal two shelves which can be used to store such things as books, tissues or an extra blanket.

YOU don't have to be a skilled craftsman to build this attractive and useful bedside cabinet. Anyone can do it with hand tools and the cost is moderate too. It's handy for holding a lamp, radio or telephone and the two shelves can be used for storing small items and an extra blanket.

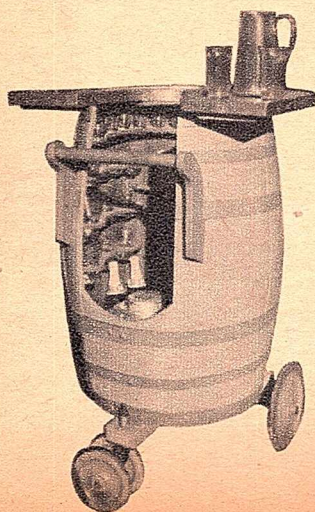
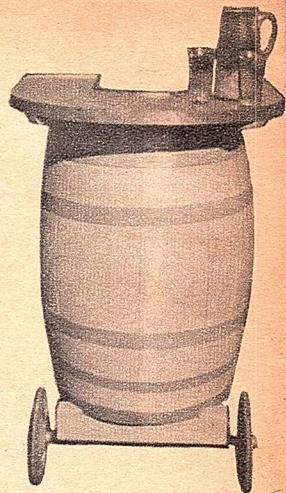
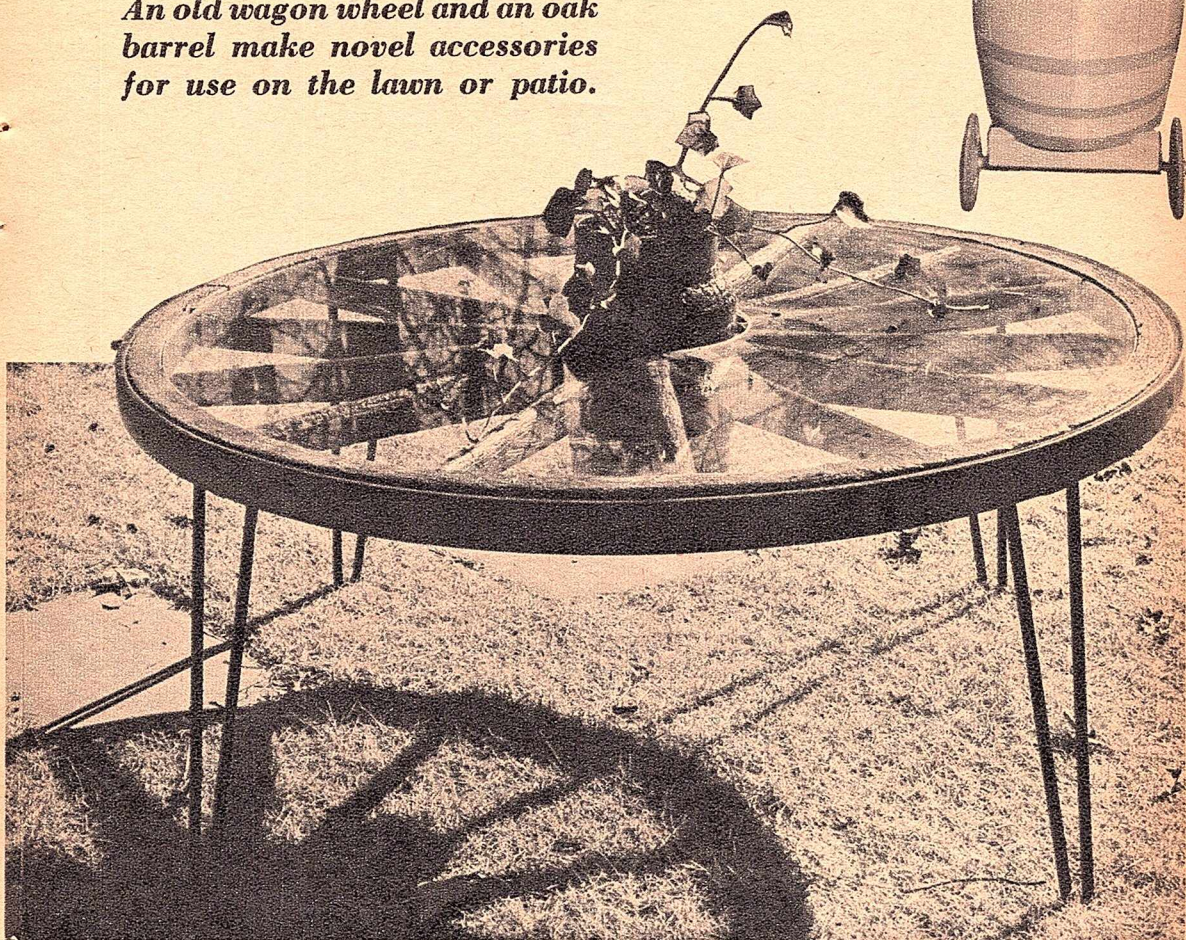
The drawings make construction clear. Simple 1x2-inch framing is first joined with corrugated metal fasteners. Then the back and sides are covered with $\frac{1}{4}$ -inch Masonite Ridgeline, a durable hardboard with a lightly-embossed surface that takes a finish well. This material is also used for the sliding doors and the shelves. As illustrated, the doors slide in metal or wooden tracks; another way is to rout grooves in the framing members.

The Marlite top which we used has a marble pattern which is predominantly brown. The edges of the top panel and the woodwork were painted brown to match this while the rest of the exterior was done in gray. •



OUTDOOR FURNITURE

An old wagon wheel and an oak barrel make novel accessories for use on the lawn or patio.



NEXT time you have a lawn party, roll out the barrel bar and serve refreshments at an attractive wagon wheel table. Both pieces of furniture can be made at relatively little cost and no special skills are required.

The bar is a 45-gallon oak whiskey barrel mounted on wheels. It has a 12x20-inch opening at the rear for access to the inside. Six shelves, rounded to fit the interior, have openings cut with an expansive bit to hold tumblers, goblets and whiskey glasses. Inside, near the handle, are hooks for accessories. The floor of the barrel serves to hold bottles and an ice cube container.

[Continued on page 166]

BARREL BAR contains six shelves with cutouts to hold glasses.

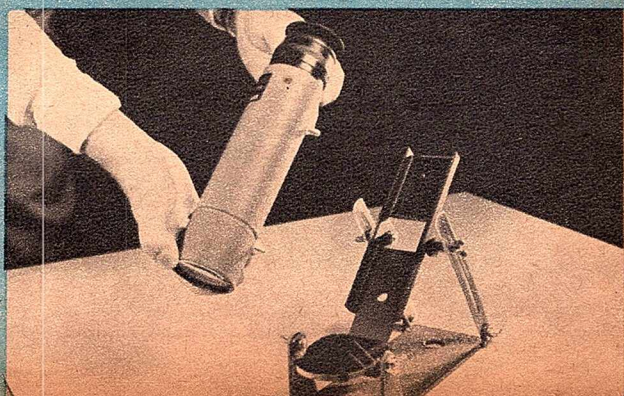
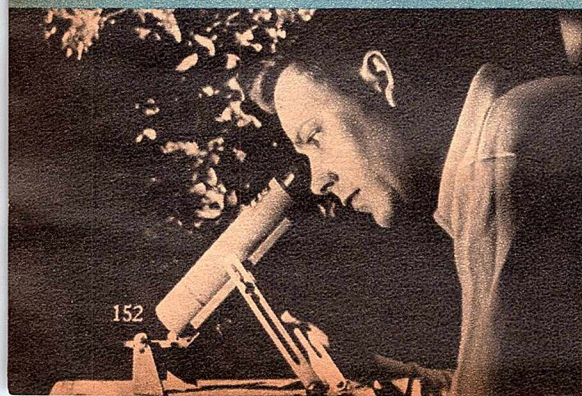


How to Look for **METEORS AND COMETS**

**The Amateur
Telescope
Maker's Page**

WIDE ANGLE of telescope and comfortable viewing position permit long observations.

TELESCOPE IS REMOVED from cradle by unscrewing wing nuts. Note mirror below.



*The new sit-down telescope, especially designed
for observing the satellite to be launched this
year, is ideal for observing comets and meteors.*

TO the naked eye it was just a faint wisp of light among the stars, but the approach of Comet Arend-Roland to the earth last spring nevertheless attracted wide popular attention. Seen with small telescopes, or binoculars of good light transmitting quality, this latest celestial wanderer looked just as it does in the accompanying photographs.

Although speeding through space as do the moon and planets, comets too appear motionless in the sky because of their distance from us. It is the flashing meteors which we call shooting stars.

Comets are generally enormous objects, the combined head and tail often stretching millions of miles in length. They follow vast elliptical orbits, glowing brilliantly from solar excitation when circling around the sun and fading completely when far away. The famous Halley's Comet of 1910 is expected to return again in 1985, yet we cannot even see it now.

The tail of a comet is actually very tenuous and becomes conspicuous only when near the sun, as charged particles stream back from the nucleus. It is interesting to note that solar radiation pressure repels the tails; when retreating from the sun, a comet "backs out," tail first!

Should a big comet ever collide with

the earth, we would witness a tremendous meteoric shower and perhaps suffer some direct hits by pieces of the head that failed to burn up as they penetrated our protecting atmosphere.

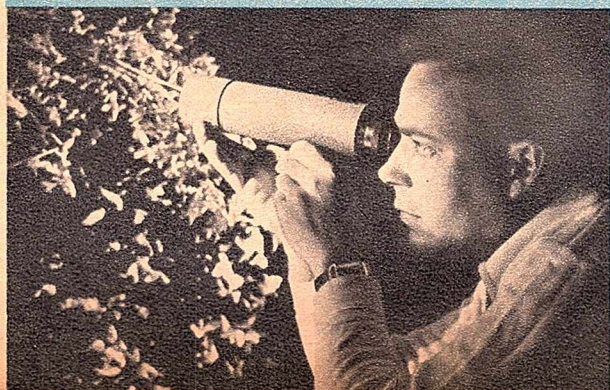
Meteors are chunks of metallic rock pursuing orbits in nearby space. There are thousands of them, ranging in size from mere pebbles to hundreds of feet across. Many are captured by the earth's gravitational field and ignite from friction as they plunge into the air. These are the falling stars. Sometimes a large meteor will explode in the atmosphere; that is a bolide. Still greater ones occasionally crash to the ground, gouging gigantic craters such as the tourist attraction in Arizona.

Meteor bombardment is constant, except for the intermittent additional swarms which also follow unconventional orbits around the sun. We can predict when the earth intercepts those groups; several provide an annual spectacle. Most prominent are the Leonids during the middle of November, the Geminids about December 13, and the Perseids every August. Up to fifty meteor streaks an hour are often visible.

The meteor showers are named for familiar constellations from which they seem to radiate in the sky. The best observing time is always after midnight, when the dark [Continued on page 191]

HAND-HELD operation for quickly scanning the sky. Elbows are rested on firm supports.

COMET AREND-ROLAND photographed by Charles Cuevas; 20 seconds, f-2.5, Royal X.



MONTHLY PHOTO CONTEST



Please put your name, address and picture-taking data on back of each print. Wrap with cardboard stiffeners and enclose a self-addressed stamped envelope or postage for return of unused photos. Prize-winning pictures are not returned. Judges are MI Editors. Duplicate prizes awarded in case of tie. Address entries to: *Mechanix Illustrated*, Photo Contest, 67 W. 44th St., N.Y.C. 36.



1st Prize (\$25)Communion
David Ward of LaPorte, Ind., won
with this sensitive study using
a 4x5 Speed Graphic with Type B
film taken at stop f-11 and 1/10th.

\$10 AwardFountains at Udaipur
Mr. B. Bhansali of Bombay, India,
used a Rolleiflex automatic with
Plus X film at stop f-11 with medi-
um yellow filter at speed 1/100th.



\$10 AwardPerspective
Ken Kennedy, Los Angeles, shot this with a
Rolleiflex, Panatomic X film, f-22, 1/30th.

\$10 AwardNewsworthy Comfort
Snapped by Lou Dorfman, Brooklyn, with a
Rolleiflex, Ilford HP3 film, f-6.3, 1/250th.





Photography Today

- *Eastman's New Polycontrast Paper*
- *Darkroom Ventilator*

By Robert Brightman

"**N**OW where the heck is that box of No. 4 paper?" And chances are when you finally do locate the paper, the stuff is either out-dated or you haven't got enough to print the enlargements of Aunt Tilly's birthday party. Being her favorite nephew you were a privileged guest and allowed to take pictures. So, in the excitement you set your camera shutter at X instead of M and the entire roll is badly underexposed.

We remember way back when Eastman had only four contrast grades—1, 2, 3 and 4. We always made sure we had an envelope of each, just in case. Then to complicate matters (really to make it easier for the dub photographer) Eastman came out with two more grades, No. 0 and No. 5 for extremely contrasty and for extremely flat negatives. This proved to be just a little too much for our pocketbook. So, we hastened to make amends by making sure that all of our negatives could be printed on No. 2, normal paper.

Now Eastman, we are glad to report, has come around to our way of thinking—just *one* grade of paper for all negatives. They call it Polycontrast. If your negatives are of normal contrast you merely use the paper as is and get a print which is the equivalent of No. 2 paper. However, if you need greater or less contrast you merely select one of seven filters which Eastman supplies in a filter kit. The kit sells for \$13.75 and includes an adapter ring with three screws which allows you to adjust the adapter to practically any enlarging lens. Filters are numbered 1, 1½, 2, 2½, 3, 3½ and 4. A No. 1 filter will yield a contrast comparable



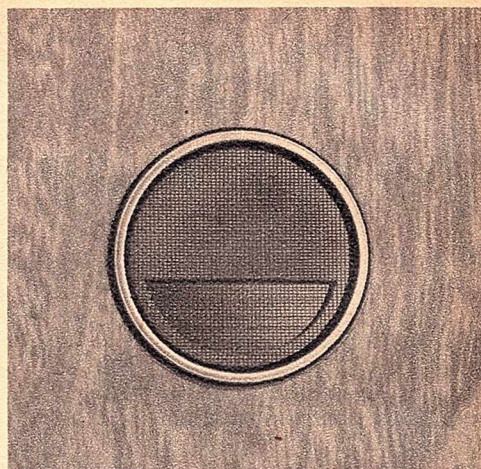
A series of enlargements showing the gradual increase in contrast, from left to right, using the seven Eastman Polycontrast filters and paper. Negative is reproduced above.



to No. 1 paper and a No. 3 filter will give you more contrast such as what you would get with a No. 3 paper and so on. To make the procedure a bit more interesting and challenging, Eastman has also made in-between half-step filters, Nos. 1½, 2½ and 3½.

The special contact papers to go with the filters are Polycontrast F (a white glossy paper) and N (a white lustre paper). Enlarging grades are called Polycontrast Rapid and are available in glossy, lustre, cream-lustre and cream-silk. All papers come in single as well as double-weight thickness.

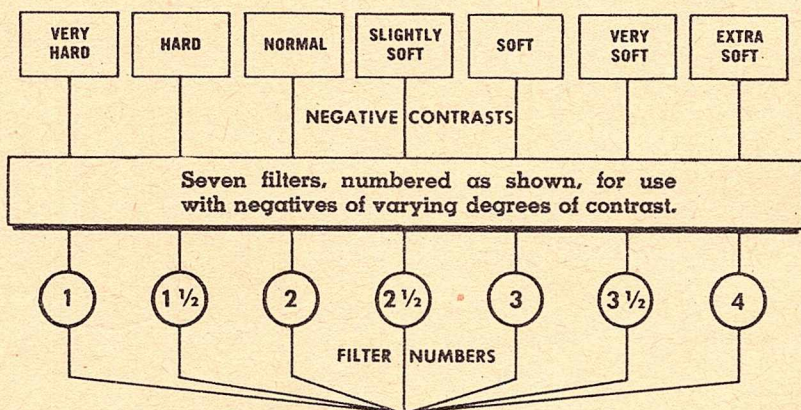
Since the paper depends upon blue and yellow light for contrast control, a new safelight called OC is recommended and should be used. Because of the exact balance of the paper to blue and yellow light, special compensating filters to be inserted over enlarger lenses are available. For example, if you have a fluorescent lamp enlarger such as the Kodak Hobbyist, a No. CC-40Y compensating filter should be used. Other light sources, of course, require different compensating filters. Recommended fil-



Midget light-tight louvers for darkroom ventilation are four inches in diameter.

ters for other light sources are included with the instruction sheets packed with the paper.

The seven pictures shown on the bottom of pages 156 and 157 were all made from the same negative. The first picture at the [Continued on page 162]



FRESH PAINT TIPS

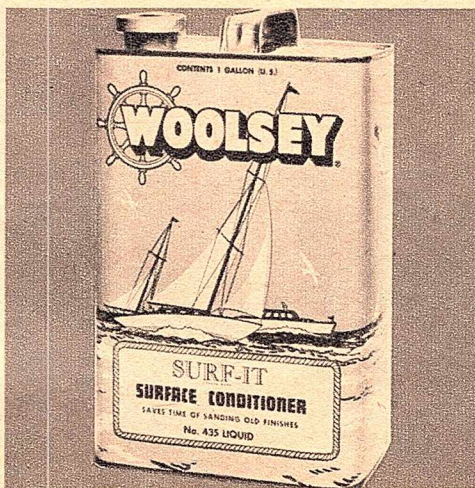
NEWSPAPER, being very absorbent, is good for giving brushes a preliminary cleaning. Keep replacing paper until no discoloration appears.



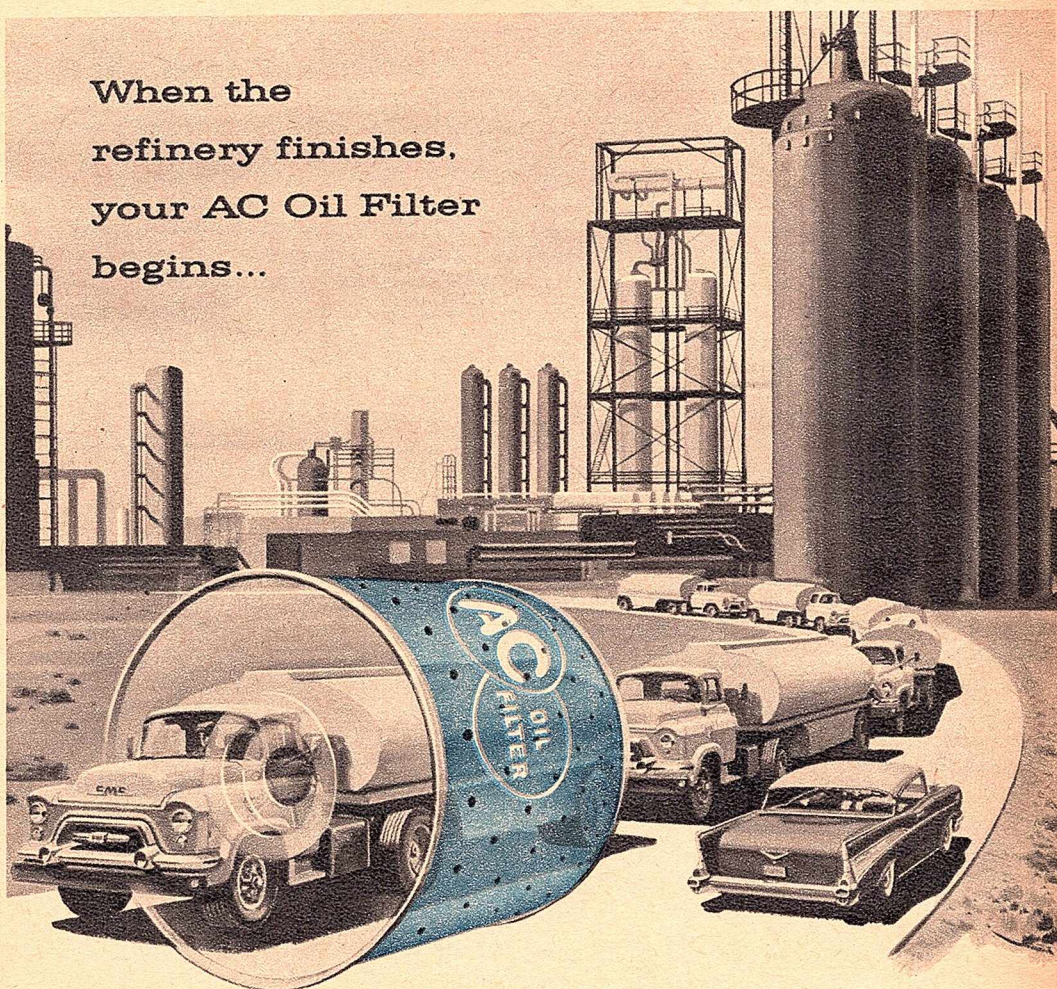
BRISTLES of freshly cleaned brushes can be kept straight and free of dirt by wrapping them in aluminum foil. Press the foil tight to exclude air.

VINYL PLASTIC paint dries to a velvet finish; it contains an anti-microbe compound said to germ-proof walls for years.

SURF-IT conditions old painted or varnished surfaces for refinishing, eliminates need for sanding to provide "tooth."



When the
refinery finishes,
your AC Oil Filter
begins...



...cleaning 36,000 gallons
of oil every 5,000 miles!

Change your



**OIL
FILTER**
every
5,000 miles




Watch WIDE WIDE WORLD—NBC-TV

An almost unbelievable volume of oil recirculates through your AC Full-Flow Oil Filter in 5,000 miles of driving—as much as 36,000 gallons.

Your oil filter is faced with the job of cleaning that vast quantity of oil in six months or less of average driving... a full six quarts for every 30 seconds at normal speeds.

That's why it's so important for you to change your AC Oil Filter regularly. A fresh AC Filter takes out dirt and bits of metal as small as 1/100,000 of an inch. It keeps your oil clean and on the job... protects the vital engine parts in your car from the damage dirt can do.

When you change your oil, check the mileage since your last filter change. For your engine's sake, change to a new AC Oil Filter at least every six months or every 5,000 miles your car is driven.

AC SPARK PLUG  THE ELECTRONICS DIVISION OF GENERAL MOTORS

When Answering Advertisements, Please Mention MECHANIX ILLUSTRATED

Septic Tanks

[Continued from page 120]

and 10 feet from property lines or dwellings.

The exact extent of drain field needed can be determined by a percolation test. Dig a series of holes in the proposed drainage area to the depth the lines will be placed. Soak the holes with water, then fill to a depth of six inches. Time how long it takes the water to fall one inch. If it takes three minutes or less, and the family numbers under five persons, a minimum of 100 feet of 18-inch trench tile should be used. If fall time is five minutes, 150 feet of trench is required. If it takes 15 minutes, figure on 200 feet. If an hour is required for a one-inch fall, the site is unsuitable for a field.

Having a septic tank cleaned costs about \$25 and, to avoid clogging, your 750-gallon one-chamber tank should be cleaned every four years. Two-chambered tanks may operate as long as 10 years without cleaning. In any case, smaller tanks need cleaning more often.

Inspect your tank before cleaning by probing its contents. Bacterial action disintegrating the sewage causes heavy soil-like material to settle to the bottom while lighter material floats to the top as scum. Bacteria operate in the area between the scum and the sediment and this space grows progressively less as the tank is used. A probing stick or shovel will reveal how thick the scum is and how much clear area remains between it and the bottom sediment. A cleaning is in order if the space is less than one-half the total depth of the tank.

Do not use the various preparations that are sold for "cleaning" septic tanks. The relief they give is temporary and eventually harmful.

A properly installed septic tank requires little maintenance and is a *must* wherever municipal sewage disposal is not available. Be sure to check with your local health department before and during installation. By heeding their advice, many mistakes can be avoided and you will be assured of many years of good service from your tank.—David X. Manners •

That Black Box

[Continued from page 149]

posts and connectors. A check on thousands of dead batteries showed that 62 per cent expired from overcharging, 20 per cent from sulphation.

While there are many additional lights and electrical accessories on current cars, the tendency toward confining long-distance trips to daytime driving probably explains why overcharging continues to be such a prevalent cause of battery failure. In other words, if you are on a long trip, it is perfectly okay to use the radio and air conditioner.

In many areas ordinary tap water is entirely satisfactory for use in batteries, but if the available water is high in metal content, always use distilled water.

Why 12 Volts?

The chief reason for the popularity of the 12-volt battery is improved ignition at higher speeds. Also cells in 12-volt batteries can be just about half the size of those in their six-volt cousins. That's why the current 12-volt job weighs about the same as the six-volt variety and fits into about the same space. And that leads us to the matter of the battery's initial capacity. This is best described as the quantity of current which a battery will deliver over so many hours of time. That's what we mean by ampere-hours. If the battery is a 100-ampere-hour job, you can expect to have it deliver five amperes steadily over a period of 20 hours before it hollers for help. During all this time voltages should not drop below 1.75 volts per cell.

Checking the battery's condition by hydrometer seems to be losing popularity, although it still is an entirely satisfactory way to determine how the cells are behaving. Use of a voltmeter has become the more popular system. The filling station attendant checks to see what the difference is between the voltage reading of the highest and lowest cell. If this is more than .05 volt, he will recommend that the battery be replaced. A voltage reading is meaningless unless the battery is under a load. In other words the battery should be cranking the car while the reading is being taken. Most battery voltmeters have a built-in shorting coil to put the bat-

[Continued on page 162]

When answering advertisements please mention
MECHANIX ILLUSTRATED

Get into your car with New Pride

Restore that **NEW CAR FEEL** with

Why drive a car that just "gets you there"—when it's so easy to have a car that's a thrill to handle... full of pep, performance and GO! Your Doctor of Motors—your skilled mechanic—knows how to bring back that satisfying "new car feel."

Doctors of Motors everywhere install Perfect Circle 2-in-1 Chrome piston rings to assure top performance. Perfect Circles are plated

with thick, solid chrome that resists wear—more than doubles the life of cylinders, pistons and rings.

For long life and responsive power with positive oil control, ask your mechanic to install Perfect Circle 2-in-1 Chrome piston rings in your engine! Perfect Circle Corporation, Hagerstown, Indiana; The Perfect Circle Co., Ltd., 888 Don Mills Road, Don Mills, Ontario.

PERFECT CIRCLE

2-IN-1 CHROME PISTON RINGS

You'll be surprised how quickly and economically your Doctor of Motors can bring back a "New Car Feel" to your car!



Photography Today

[Continued from page 157]

extreme left was enlarged with a No. 1 filter and the last one with a No. 4 filter. Because of the half-steps, adjacent enlargements don't seem to show much difference in contrast. However, if you will compare the two pictures at opposite ends you will readily see the difference in contrast between the two prints. The prints were made from a 35mm Plus-X negative enlarged through a Kodak Hobbyist enlarger with compensating filter No. CC-40Y placed over the enlarger lens. All the pictures, except one, received a uniform five-second exposure with full development, 1½ minutes in Dektol developer. The third picture received a seven-second exposure.

Darkroom Ventilation

If you spend much of your life in the darkroom, you will probably appreciate air uncontaminated with the fragrance of hypo. A little gadget that should help out is a midget louver made by the Midget Louver Company, 8 Wall Street, Norwalk, Connecticut. These louvers, four inches in diameter, are made for outdoor as well as indoor use. A set of twelve, enough to ventilate the average darkroom will cost you \$10. They are easy to install by first drilling a four-inch hole by means of a hole saw and inserting the louver. •

Photo Underwater

[Continued from page 125]

Therefore, color correction is necessary. Because of the refraction of light through water, plastic and air, distances appear one-fourth less than they actually are. You should therefore set your focus for three-quarters of the actual distance.

As a general rule, exposures up to five feet below the surface are the same as they would be above the surface; from five to fifteen feet you should open up one more stop. When you start going any deeper, which is hardly likely for the average person, you should use a light meter.

So there you are. For approximately \$12 you can buy all the materials for the Brownie case—and the fun you'll have shooting pictures below the surface will make it well worth the price. •

That Black Box

[Continued from page 160]

tery under load. A battery is fully charged if readings show 2.10 volts per cell and only 25 per cent charged if readings fall to 2.00 volts.

One advantage of the hydrometer is its low cost; a good voltmeter costs about ten times as much. But the hydrometer must be used carefully. It is important to hold it in a vertical position so that the float doesn't bind. Squeeze the rubber bulb before inserting the nozzle in a cell and release it slowly in order to allow the solution to be drawn up into the glass barrel.

Always return the solution to the same cell from which it was withdrawn. Don't judge conditions merely by the specific gravity of each cell but by the *difference* between their readings.

Cells that read 1.190 are only half-charged, but if there is a difference of .050 between the highest and lowest reading cells, the battery is about ready to be junked.

Many a battery fails because the fan belt slips, just dropping generator output. A poorly grounded generator regulator will upset the balance between charge and discharge.

A sticking switch for the stoplights can pull down the best of batteries—and so will the little light in the glove compartment if its switch fails to go off when the lid is closed. The wise owner also will bear in mind that a battery isn't able to operate as efficiently at low temperature.

At zero the engine requires 150 per cent more starting power than when temperatures are at summer level and, at the same time, the battery develops only 40 per cent of its cranking power.

Still high on the list of attentions you can give the battery is prevention of corrosion on posts and connectors. Apply a light film of Vaseline or grease to the parts likely to corrode, but not *between* the posts and the connectors. If these parts have already corroded, wash them with diluted ammonia or soda solution and brush to a clean, bright surface.

Your 12-volt battery is a marked improvement over its six-volt predecessor, but keep in mind that it can discharge four times as fast! So watch your battery's balance. •

"The battery backed up by 2,000,000 miles of testing"



Auto-Lite Sta-ful is tried, tested, and proved for long life and quick, easy starts in the coldest weather. Two years and more than 2,000,000 miles of testing showed the following results:

- Not one battery failed.
- 95% gave better cold-weather starting than required of *new* batteries.
- None of the batteries needed water more than 3 times a year.

You just can't buy a better battery at any price!

**NEEDS WATER ONLY
THREE TIMES A YEAR***

*IN NORMAL CAR USE



6 or 12 volt

Dry Charged...

Fresh when you buy!



**OTHER AUTO-LITE BATTERIES
AS LOW AS \$13.95**

AUTO-LITE MANUFACTURES OVER 400 PRODUCTS, INCLUDING SPARK PLUGS, BATTERIES, WIRE AND CABLE, AND AUTOMOTIVE ELECTRICAL SYSTEMS . . . SOLD THROUGHOUT THE UNITED STATES AND CANADA.

Book Notes

THE UNDERWATER GUIDE TO MARINE LIFE.
by Carleton Ray and Elgin Ciampi; published
by A. S. Barnes and Co.; 338 pages; \$8.75.

SKIN-DIVING with an Aqua Lung is one of the most remarkable experiences anyone could have and we recommend it. For those who have equipped themselves for underwater breathing, we also recommend this book. Ray and Ciampi, divers for twelve years, acquaint the reader with the ocean bottom and trace the evolution of its life. Then, with fine illustrations by Teiji Takai, Japanese artist, and photographs by themselves, they depict the present inhabitants of the sea, from plankton to whales, emphasizing their behavioral characteristics. Additional sections cover photography, diving equipment and procedure. The knowledge gained makes the book worth many times its cost to any diver.

—J.S.

PRACTICAL RADIO SERVICING, by William Marcus and Alex Levy; published by McGraw-Hill; 559 pages, 473 illustrations; \$8.50.

ASSUMING the reader has no knowledge of the subject, this book guides him from a simple interest in radio servicing to the point where he can operate as a professional repairman. It tells how to test, repair and replace the parts of the more common types of AC-DC receivers, portables and phonograph combinations. It also specifies the tools and instruments needed and explains their use. The authors are radio teachers of long experience and their book is recommended highly for self-instruction.—R.H.

COMPLETE HOME IMPROVEMENT HANDBOOK, by Evans Associates; published by McGraw-Hill, New York, N. Y.; 1024 pages; \$5.95.

THIS veritable bible of home repair covers every conceivable subject from abrasives to zinc counter tops and not only tells how to build it but where and by what name to buy it. More than 2000 photos and drawings illustrate the informative text. Whether you're adding a new roof, installing plumbing or wiring, repairing your walls or painting them, this is the book for you. It will soon pay for itself in money and time saved by knowing *what* to do and, even more important, *why* to do it.—F.H.

Child's Storage Unit

[Continued from page 138]

joint of the linoleum and wood after the edge is painted.

The separate bookcase has plenty of room for oversize children's books, plus two small drawers at the top. It was designed to be placed in "problem corners," which are fairly common. This unit could be extended farther along the wall, but space was not available here. Again, as with the toy cabinet, procedure will remain the same regardless of your own room dimensions. This bookcase was also planned as a matching piece for the cabinet so that a unified built-in look could be achieved, although neither piece is attached to the walls, or to each other.

Begin by cutting the top panel to length; then fit the top panel to your wall contour. Cut the dado at the righthand edge to accept the side member. Notice that the right side piece does not extend all the way to the floor. The bookcase should be several inches higher than the toy cabinet to give the most pleasing effect.

Now cut the left upright, the shelf and the bottom, all of which are nine inches deep. Before assembling, it is suggested that rabbets be cut into the top and right pieces to accept a hardboard back. Assemble the left upright, the shelf and bottom so that they are flush front and rear. Now assemble the top and right upright flush front and back.

Make the base assembly from 5-in. high stock. The ends of the base may be molded to your baseboard for a perfect fit.

Two identical drawers are used. For slides, cut four hardwood strips $\frac{3}{16}$ -in. thick by slightly less than $\frac{1}{2}$ -in. high to provide free sliding in the matching grooves. Glue and nail the strips in place, sinking all nailheads below the wood surface.

This completes actual construction. Sand the cabinet and bookcase carefully and paint in bright colors. Our units were painted white and royal blue, and add a great deal of charm to the room. •

When answering advertisements please mention
MECHANIX ILLUSTRATED

Outdoor Shower

[Continued from page 134]

When it has set sufficiently to bear the weight of the frame, lift the frame upright to fit its legs into the holes and finish filling the holes with concrete. The mix will soon set enough to hold the frame in place; check the frame's vertical with a plumb line before the concrete sets.

Installing the pipe fixtures is the next step. You will need five lengths of half-inch galvanized pipe measuring 4, 6, 16, and 42 inches, with the fifth an indeterminate length, and all with threaded ends. While the pipe leading away from the shower's base is of no special length, it should not extend much beyond the immediate shower area; this is the pipe to which the hose attaches.

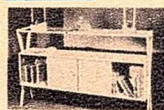
Other plumbing fixtures required are two half-inch pipe elbows, one half-inch "T" fitting, two half-inch gate valves, two half-inch shower nozzles with extension necks, and pipe clamps. Proper assembly of these pieces is easily ascertained from the diagram.

The final stage of your shower is the setting in place of the four 16-inch-square patio blocks.

Using the earth removed from the three post holes, build up an area one yard square directly in front of the shower frame. Tamp it level with a shovel and center the four patio blocks on this mound. Then distribute about three buckets of pea gravel evenly over the area.

To finish off, paint the shower frame with a waterproof paint. It's a good idea to hill up the concrete around the legs of the frame to shed water away from the posts. •

mi
modern furniture



Build these handsome modern units from the concise plans drawn up for MI readers by a widely known designer. You can get construction data plus explanatory diagrams for all three pieces by remitting 50 cents to MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Conn. Plan No. F-1.

Golden Hammer Awards

[Continued from page 133]

Kenneth P. Conrad, Unionville, Conn. . . . K. C. Buzzell, Auke Bay, Alaska . . . Charles Neff, Deputy, Ind. . . . James R. Pritchard, Titusville, Fla. . . . Thomas R. Downs, Del Paso Heights, Calif. . . . Carlyn C. Reid, Opa-Locka, Fla. . . . Mrs. H. W. Smiley, San Bernardino, Calif. . . . Charles B. McMahon, Nashville, Tenn. . . . Walter Iber, Jr., Pekin, Ill. . . . L. S. Haynes, Jr., Bryn Mawr, Pa. . . . E. M. Harvey, Calgary, Alberta, Can. . . . Allen Strickland, Knoxville, Tenn. . . . LaVerne D. Krauel, Audubon, Iowa . . . John C. Goeller, Lancaster, Ohio . . . Guane Bubenzer, Anderson, Ind. . . . Wayne P. Yates, Detroit, Mich. . . . John Rogers, Dallas, Tex. . . . Willis Herbeck, Bloomington, Ill. . . . Ernest D. Hills, Chillicothe, Ill. . . . G. Augel, Fort Smith, Ark. . . . Steve Ditta, Laurelton, Queens, N. Y. . . . Harry Sorensen, Wellington, Ohio . . . R. E. Kuhn, Cheyenne, Wyo. . . . John D. Edwards, Erlanger, Ky. . . . Gerard Rompre, Domremy, Sask., Can. . . . C. H. Turley, De Soto, Mo. . . . William R. James, Cleveland, Ohio . . . Bernie S. Levy, New Orleans, La. . . . Donald Oliver, Hartford, Wis. . . . H. J. Verrette, Bath, Mich.

The following craftsmen have been awarded
CERTIFICATE OF MERIT:

H. C. Shaffer, Ivyland, Pa. . . . Donald Schmidt, Springfield, Minn. . . . Charles F. Azara, Youngstown, Ohio . . . J. O. Devau, Derby Line, Vt. . . . T. G. Jones, Pulaski, Va. . . . Tim Teyler, Portland, Ore. . . . B. J. Clark, Fort Worth, Tex. . . . Henry Salkvitch, Bristol, Pa. . . . Keith Ellis, Chinle, Ariz. . . . Frank Knorowski, Bronx, N. Y. . . . Theodore J. Wynga, Fairhaven, Mass. . . . Bill McGowan, Monterey, Calif. . . . A. A. Fourie, Pretoria, Transvaal, S. Africa . . . Alfred Guido, Brooklyn, N. Y. . . . S. Askins, Staten Island, N. Y. . . . Harold D. Austin, Miami, Fla. . . . B. F. Borsody, Arlington, Va. . . . Robert Nelson, Galesburg, Ill. . . . Johnny Hawkins, Candler, N. C. . . . Leonard M. Goodin, Creve Cover, Ill. . . . Paul Bouchonnais, Detroit, Mich. . . . Paul Ciliento, Lodi, N. Y. . . . George Wikanowa, Priors Matson, England . . . Donald E. King, Chesapeake, W. Va. . . . Arthur E. Ader, Rolfe, Iowa . . . Reta Wotton, Prince Edward Island, England . . . Ethel M. Davidson, Woodlawn, Va. . . . Wilfred Hansen, Iron River, Mich. . . . George O'Brien, Aurora, Neb. . . . Marvin Combs, Hamilton, Ohio . . . Robert Parter, Grayling, Mich. . . . Frank R. Picirillo, Niagara Falls, N. Y. . . . Paul A. Brown, Seattle, Wash. . . . C. F. Andrews, Pasadena, Tex. . . . Ted Sobczynski, Cleveland, Ohio . . . Ian Cransarick, Via Gisborne, New Zealand . . . H. R. Norchauer, Baton Rouge, La. . . . Dick Watson, Austin, Minn. . . . Harry Lindow, Green Bay, Wis. . . . Warren Loan, Fenwick, Ont., Canada . . . Gregg Egger, Columbus, Ohio . . . Louis Bauer, Lloydminster, Sask., Canada . . . James Bly, Whitehall, Ohio . . . James H. Bangs, Jr., Pittsfield, Mass. . . . A. Delaronde, Wilmington, Mass. . . . Art Kloc, Evanston, Ill. . . . Harold Rupp, Fredonia, N. Y. . . . Jim O'Drane, Pembroke, Ont., Canada . . . John Stolz, Newark, N. J. . . . William Braun, Milrose Park, Pa. . . . R. Lucher, Port Credit, Ont., Canada . . . M/Sgt. Robert W. Christiansen, Champaign, Ill. . . . Denis R. Duchene, Chatham, Ont., Canada . . . Edward Ashmore, Buffalo, N. Y. . . . Gordon A. Livingston, Fresno, Calif. . . . Frank A. Solner, Worth, Ill. . . . Charles Segal, Rock Hill, S. C. . . . Oscar M. Sebastian, Freeport, L. I.

Watch for the names of more winners next month. •

Outdoor Furniture

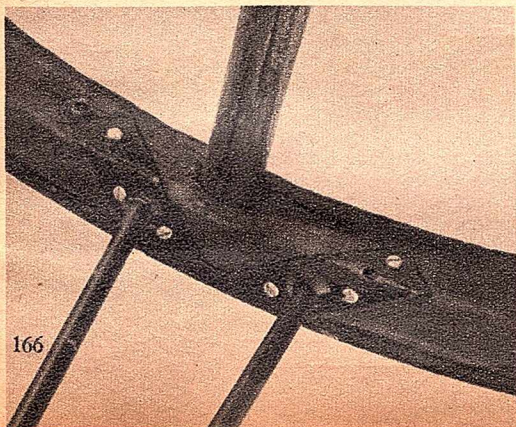
[Continued from page 151]

The counter for the top of the barrel is exterior plywood edged with wood or a metal strip. Whatever edging material is used, it should be allowed to project above the surface of the counter to form a retaining lip. Both the shelves and the counter can be held in place by installing cleats on the undersides, fastening them with glue and screws. The brackets for the handle are cut from scrap stock and the handle itself is cut from an old broom. Any suitable wheels can be used. In this case they were salvaged from a discarded child's toy. Total cost to make the bar shown was only \$12.50.

Making the wagon wheel table requires little effort on the part of the builder besides cleaning and finishing the wood and attaching the legs. Measurements for the circular glass top can be given to a local glass company. Ours was supplied, cut to fit, at a cost of \$18. The plant holder can be a small olive jar such as the one shown or anything similar. To hold it in place, the lower side of the wheel hub was sealed off with a thin metal disk. Including the wagon wheel, legs and glass top, the table was built at a cash outlay of less than \$30.

In finishing the wheel, it was first cleaned thoroughly with a steel brush. Then the wood was given two coats of clear shellac, followed by a single coat of spar varnish. A natural finish such as this brings out the real rustic beauty of the wood. The metal parts at the hub and rim were painted flat black to match the wrought iron legs. The wood and metal parts of the barrel bar can be finished in the same way. •

METAL LEGS are adapted to wagon wheel by bending the plates around the rim as shown.



Tilting Trailer

[Continued from page 145]

braces in position, remove the wheel and bolt them in place.

The fenders are cut from tires slightly larger than those used for the trailer. We found that 15-inch tires have just the right contour for the 12-inch Crosley wheels. Simply outline the tire section with grease and cut with a heavy pocket knife. The grease lubricates the blade, otherwise frustration will result in attempting to cut the rubber. Attach each fender to the brackets with four stove bolts, using washers under the heads.

After being given a coat of paint, your trailer is finished. You'll find that it looks as good as any on the road and that your boating pleasure is greatly expanded by taking trips overland to new waterways. •

NYMPH

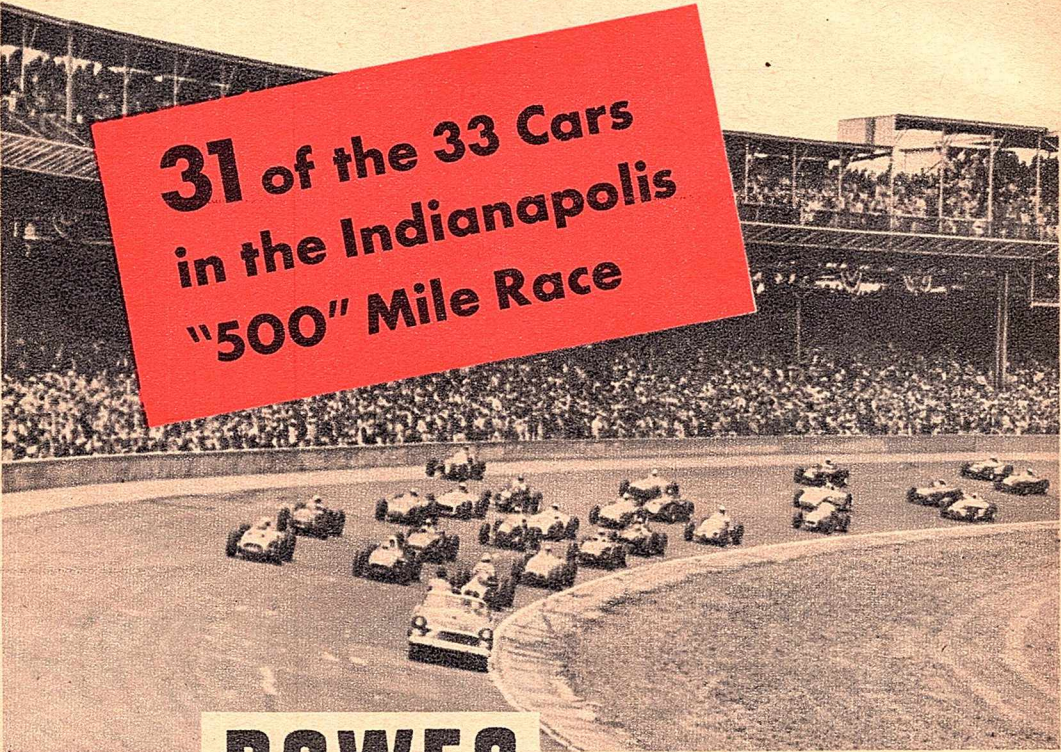


This centerboard sloop of molded Fiberglass can be built for less than \$500, including sails. Length is 15'-10"; beam, 5'-4"; draft, 3'-3". She weighs 450 lbs., complete. Order your plans from MI Plans Service, Fawcett Bldg., Greenwich, Conn. The price is \$3.00. Be sure to specify NYMPH, Plan No. B-228.

Steam-Powered Tugboat

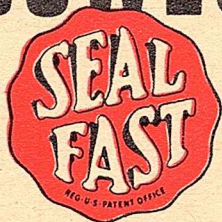


This model replica of the Esso Honduras was designed to run on steam power, but the plans also show an alternate installation of a battery-powered motor. Instructions and full-scale plans can be obtained for 50 cents from MECHANIX ILLUSTRATED Plans Service, Fawcett Building, Greenwich, Conn. When ordering please specify Plan No. M-229, Tug Boat.



**31 of the 33 Cars
in the Indianapolis
"500" Mile Race**

used **BOWES** **BRAKE FLUID**



When 31 out of 33 of the top race drivers in the world "Bet their life" on the same Brake Fluid—it *must be the best, the safest* brake fluid on the market.

Don't Take Chances on Your Life...

Bowes Brake Fluid is
used and approved in
Automobile racing,
and approved by the
United States Auto Club.

- 1** Have your brake fluid checked at least each time you get an oil change.
- 2** There are many dangerously inferior brake fluids on the market.

3 ***YOU KNOW...***
BOWES BRAKE FLUID
IS SAFE!

BOWES "SEAL FAST" CORP., INDIANAPOLIS 7, IND. • HAMILTON, ONTARIO, CANADA • LONDON, ENGLAND
BOWES PACIFIC CORPORATION, RIVERSIDE, CALIFORNIA

WEEKEND PROJECT

COCONUT PLANTERS

SUN	MON	TUE	WED	THU	FRI	SAT
	1	2	3	4	5	6 7
8	9	10	11	12	13	14
15	16	17	18	19	20	21
22	23	24	25	26	27	28



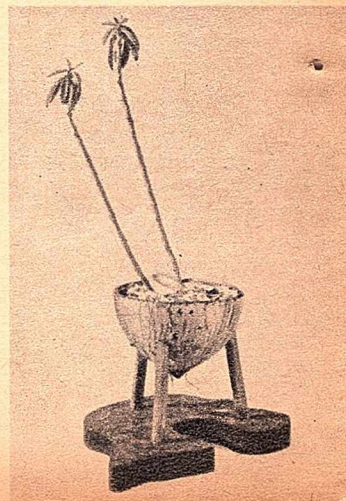
CUT NUT into two equal halves with hack saw after milk has been drained off through eye.



REMOVE MEAT with strong, narrow-bladed knife; drill three holes in bottom for drainage.

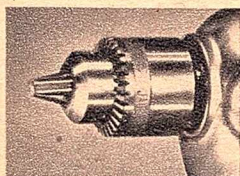
PLANTER'S STAND consists of three dowels set in base; tops of dowels are cut at 45° angle.

MINIATURE PALMS planted in a bleached shell; Novoply base is cut in shape of an island.

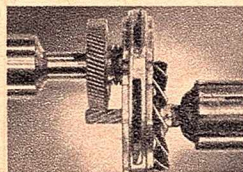


Black & Decker® U-3

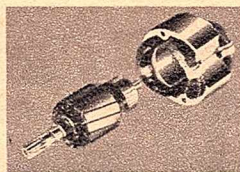
—packs more power—does more jobs!



GEARED CHUCK same as used "by industry for extra holding power and accuracy."



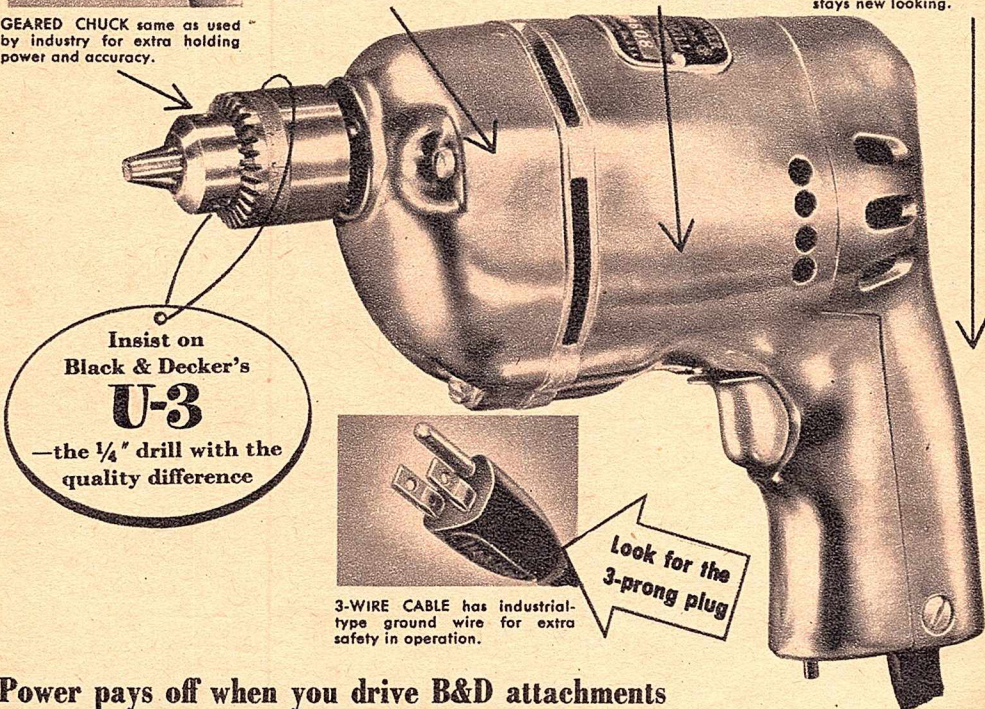
HIGH-QUALITY HELICAL GEARS give quieter, smoother flow of power from motor.



FAMOUS B&D-BUILT MOTOR has 45% more power, 100% greater torque (turning force).



SLIM, TRIM HANDLE is shaped to fit the hand for better control. Bright, highly polished housing stays new looking.



Insist on
Black & Decker's
U-3
—the 1/4" drill with the
quality difference



3-WIRE CABLE has industrial-type ground wire for extra safety in operation.

Look for the
3-prong plug

Power pays off when you drive B&D attachments

- Trims hedges
- Saws wood
- Drives screws
- Sands any surface
- Polishes any material...and DRILLS!

Most drills can bore holes without trouble. But driving attachments really separates the tools from the toys. That's why we gave the

Black & Decker U-3 Drill extra power, extra torque, extra quality. Insist on the U-3 Drill and B&D attachments by name at your dealer's—don't accept less than the best!



Look under "Tools-Electric"



Black & Decker®

World's largest maker of Portable Electric Tools



SEND COUPON FOR HANDY IDEA BOOK!

THE BLACK & DECKER MFG. CO.
Dept. R087, Towson 4, Md.

Please send me a copy of your "Handy Tips" booklet. I enclose 25c to cover cost of handling and mailing.

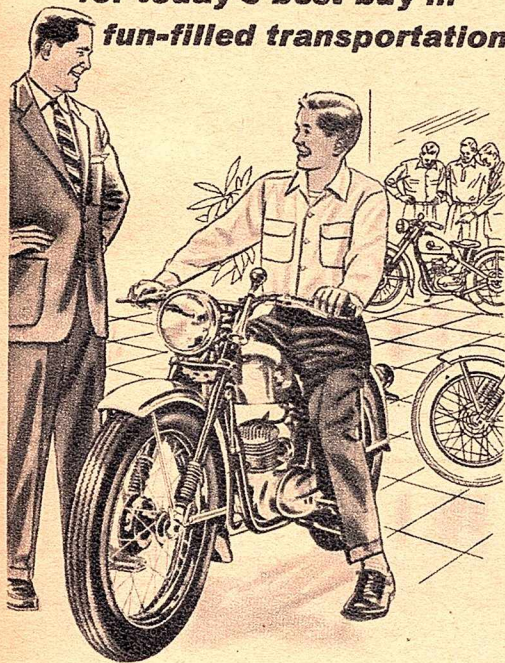
Name.....

Address.....

City.....State.....

ONLY \$75 DOWN

**for today's best buy in
fun-filled transportation**



**Ride to work or play on a
HARLEY-DAVIDSON**

HUMMER

New liberal purchase plans — After minimum down payment, monthly instalments average only \$18.74 for vehicle, property and liability insurance and carrying charges.

Operating costs as little as 35¢ for 100 miles of travel. Maintenance and depreciation costs are negligible when compared with other forms of transportation.

Beat traffic worries — There's plenty of room to breeze between crawling or standing lanes of traffic, get up front ahead of the crowd. No parking problems either! Enjoy traveling the Harley-Davidson way — money-wise, pleasure-wise.

Good deals on other new and used models too—Visit your dealer for a trial ride and details. Or, write us for free literature.

HARLEY-DAVIDSON MOTOR CO.

DEPT. MI • MILWAUKEE 1, WISCONSIN

You Think This Is Hot?

[Continued from page 97]

a little dingus in your brain, and reacts to blood temperature.

These four thermometers relay constant reports via the nervous system to a Central Heat Control. The exact location of CHC has not been pin-pointed but it's believed to be about where the spinal cord joins the brain. Anyway, CHC gets all these reports on skin temperature and blood temperature, does some fast figuring without counting on its fingers and sends out impulses that control heat production from food, circulation of the blood and sweating.

Most of us, when modestly if not stylishly clothed and when engaged in our usual activities, are comfortable at temperatures of about 70° F. At this point Central Heat Control gets temperature readings from the skin and the hypothalamus and maintains a nice balance between heat production and heat loss.

(All these statistics apply to the average male. Women are warmer in winter due to a layer of insulation (polite term for a blanket of fat) under their skin. They are also cooler in the summer because their chemical process of converting food to heat is slowed down more than a man's. This isn't fair. Write your congressman—to-day.)

In cold weather, Central Heat Control gets its usual up-to-the-minute reports and gets busy. It constricts the millions of tiny blood vessels in the skin so less body heat is lost by radiation. It slows down the circulation of blood. And it speeds up the conversion of food into heat energy. Pretty busy, eh?

But when the mercury soars old CHC really goes into action. The hypothalamus informs it that body temperature is rising. Immediately, Central Heat does a number of things. First of all it opens up the blood vessels and increases the heart beat. The effect of these two steps is to flush more blood through muscles and organs where some of the heat is taken out, and to send more blood through the skin where heat is lost through radiation and conduction to clothing.

Another thing accomplished by Central Heat Control when faced with rising temperatures is to activate that lovely process known, in polite magazines, as sweating.

Sweating, friends, is a wonderful thing. Only humans and horses sweat. Dogs sweat from their tongues, by panting, but even anthropoid apes lack decent sweating gear.

Each of us has 2,000,000 sweat glands—though at this time of year you may feel this is an understatement. Our sweat glands can pour out a quart and a half of sweat every hour for, maybe, eight hours at a stretch if necessary. They can even leak four quarts in one hour, providing enough liquids are taken in. Sweat glands are intertwined with the small blood vessels under the skin. There are more sweat glands in some parts of the body than in others. (Delicately put, old boy.)

When the blood gets heated in hot weather, sweat glands extract a salty liquid from the blood and pour it onto the skin where it evaporates. Thus the blood is cooled by having a warm liquid extracted from it and the skin is cooled by evaporation of the sweat itself. An IBM cannot do more.

How much heat can a human stand? Back in 1828 a genial charlatan named Ivan Ivanitz Chabert amazed theatre audiences in Europe by stepping inside a baker's oven heated to 220° (that's eight degrees above the boiling point of water). Ivan remained in there with only a leg of mutton for company. When the mutton was thoroughly cooked, out stepped Ivan—face slightly flushed but exhibiting no other ill effects. He was wearing woolen clothing at the time.

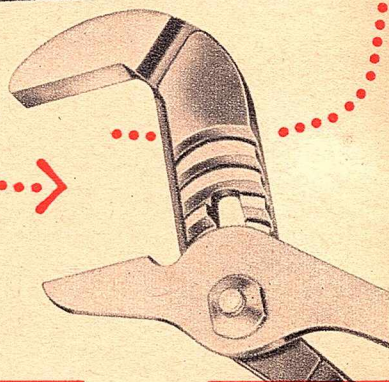
Actually, the audiences of the period shouldn't have been at all surprised by this feat. In 1774 Charles Bladgen and three other British scientists made a number of hot chamber tests. Wearing woolen garments they stayed in rooms heated to temperatures of 240-260° for periods of five to 20 minutes.

How can humans endure such heat? Well, in the first place the heat was dry, and dry heat is much easier to endure than moist heat. It's not the heat, it's the humidity—to coin a phrase. And in the second place, sweating and evaporation of the sweat kept their body heat reasonably low. In fact, body temperature rarely rose one degree, even when the surrounding temperature was 260°. These tests have been substantiated by recent Air Force "hot box" experiments. As long as the heat is

[Continued on page 172]

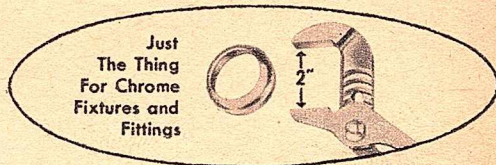
At Last!

**A "TOOTHLESS" PLIER
THAT GRIPS
WITHOUT GOUGING**



CHANNELLOCK®

No. 415 Smoothjaw PLIER



One of the handiest tools you'll ever use . . . the new "toothless", smooth-jaw plier that grips without gouging. Just the ticket for gripping chrome-plated fittings, plastic, wood and other smooth surfaces. Especially handy on chrome sink-fixtures and other hard-to-handle jobs. Jaws quickly adjustable to full 2" opening. Get yourself a Channellock No. 415 Smoothjaw Plier. You'll find it's "the right tool" on scores of jobs in home and shop.

**Ask Your Hardware Man For A
CHANNELLOCK Smoothjaw PLIER**

MADE ONLY BY

**CHAMPION DEARMENT TOOL CO.
MEADVILLE, PENNSYLVANIA**

You Think This Is Hot?

[Continued from page 171]

dry and the body can sweat, you have little to worry about—except the exit door jamming.

You've probably never read an article on hot weather that didn't include advice on how to keep cool in 10 Handy Tips. This article will be different. Here are 11 Handy Tips on keeping cool. We like to give you more for your money than any other magazine:

1. Move to Iceland. If this is financially unfeasible, take a slow yacht trip through northern waters during the summer months.

2. Drink plenty of liquids, particularly cool water. Take it easy on beer and gin-and-tonics.

3. Cut down on your diet a little, especially on high-calorie sugars and starches.

4. Wear clothing that's loose and porous. Light shades reflect more heat than dark shades. Exercise in an absorbent T-shirt; don't make like Nature Boy.

5. Suntan slowly and carefully.

6. Sleep and relax as much as possible. Don't beat your wife until September.

7. If you feel dizzy or nauseous, get out of the hot sun and into a cool tub.

8. Keep your salt intake high.

9. Try to keep your head covered and your hair wet when out in the sun.

10. Try to keep air circulating indoors with electric fans but don't sleep with a fan turned directly on you.

11. Buy an air-conditioner.

P.S.: Tip Number 11 is worth all the rest of them put together.

So—is it still hot enough for you? You should be able to do better than "It's hotter than the hinges of hell" or "I'm warmer than a bear in a mink coat."

The classic hot weather retort, of course, was delivered by Sidney Smith (1771-1845) who was asked by a lady of quality if it was hot enough for him.

Sid thought a moment, then admitted it was blamed hot. "In fact," he added, "if I get any hotter I'm going to take off my flesh and sit around in my bones."

You'll have a tough job beating that one. •

When answering advertisements please mention
MECHANIX ILLUSTRATED

Build Speedster

[Continued from page 113]

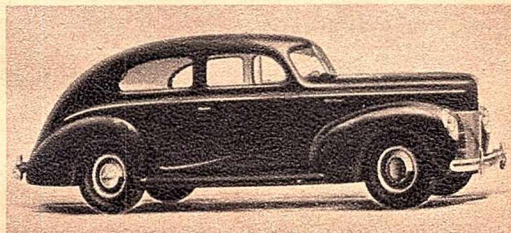
variations. In this case ordinary Reynolds aluminum mesh was used. If you prefer, you may leave the opening exposed. A sports car look can be achieved by installing a waffle-type grille assembly. A very attractive grille can be made from flat perforated metal plate or you can use the grating from a commercial lighting fixture of the popular egg-crate design.

For the sloped windshield, ordinary brackets were bolted to the body shell plus a piece of safety glass cut by the local glazier. Painting is actually the easiest part of the job. Synthetic enamel which you can purchase in any auto store is best. The paint used on this car is red with a cream trim.

Before you take the car for that long-awaited spin, look over the underside of the chassis very carefully. Make certain that all bolts, kingpins, drive shaft, steering and running gear are in apple-pie order. Then jack up the car, mount it on four blocks, start the engine and put it in gear. Check for vibrations as you gently rev up the motor. Then remove the blocks and go for that spin. •

PARTS LIST

Headlights (from 1950 Chrysler).....	\$ 4.00
Taillights (from 1950 Pontiac).....	2.00
Electrical Wiring	2.00
Grille (heavy wire mesh such as used for cashier's cage).....	2.00
Hinges for doors (trunk hinges from 1950 Chrysler).....	2.50
Latches for doors and hood (garage door pull chain latches)	2.00
Front and rear lowering shackles.....	2.00
Sway bars (from 1942-48 Ford).....	2.00
Sheet metal and screws.....	12.00
Old pieces of car frame for outriggers.....	1.00
Extra clutch and brake pedals.....	.50
Extra steering column and gear shift post.....	1.00
Windshield posts (from an old motorboat).....	5.00
Safety glass for windshield.....	10.00
Radiator (1949 Nash, even exchange).....	0.00
Labor, cutting down radiator.....	5.00
Radiator hose75
Speedster sports body kit.....	495.00
1940 Ford (used, in fair running condition).....	50.00
Total	\$598.75



THE CAR from which Sportster was built.

Best Bets For Bass

[Continued from page 99]

pilings, sunken boats and trees. When swim-trolling lakes watch wind drift. A breeze may move your boat faster than one-third mph. If so, row upwind enough to give proper troll.

Your next best bet for bass lies in fishing minnows in medium-sized rivers, either wading or from a boat, with a fly rod. Use a snagless sinker for fast water. Montgomery Ward sells a honey I wouldn't be without. Tie the sinker to the end of your line, then fasten a 14-inch leader about 14 inches above the sinker. Tie on a hook and bait up.

You'll take more bass if you'll cast across the current and let the bait swim naturally downstream, searching every pocket, hole and ledge. Keep it moving by gently raising and lowering the rod tip every few seconds, just enough to lift the sinker till you feel it roll slowly along the bottom. This is deadly, especially for smallmouths.

Here tackle is of great importance. A good casting rod is a must. The new light, very tough glass rods are great and you'll do well to invest no less than \$15 in one. These rods have as much action as a spinning rod with the added feature of strength, enough to stop a hard-fighting bass from gaining a weed bed. Five and one-half feet is about the right length. Action should be medium, enough to handle $\frac{5}{8}$ -ounce lures. To store-test action, and it's important, tie a $\frac{1}{2}$ -ounce lure to the tip. Hold the rod horizontally and notice the curve. It must be a good even curve. Next gently swing the rod back and forth. Action should go all the way down to the reel seat.

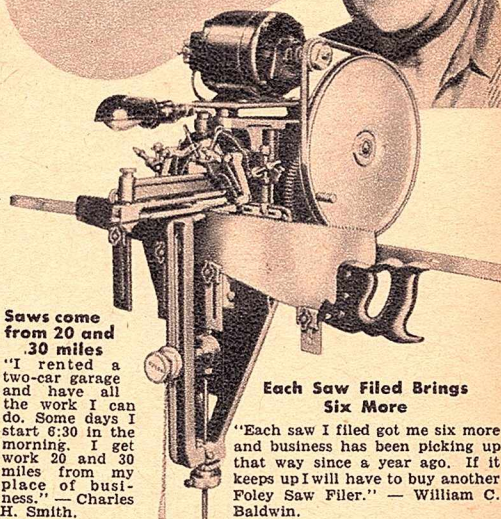
A good reel is even more important. Look for fast starting. These are the reels that give you distance and get you out to the fish. Most tackle salesmen show how long a reel spins after it has started spinning. This tells you nothing. What you want to test is how easy this reel is to start spinning. That's where the all-important difference between a dud reel and a winner lies. Some moderately priced reels meet this requirement. They're good but I believe in getting the best reel I can afford. For beginners, a level winding device should be a must.

[Continued on page 174]

FREE PLAN

Tells How to Start
Your Own Business

FILING SAWS



Saws come
from 20 and
30 miles

"I rented a two-car garage and have all the work I can do. Some days I start 6:30 in the morning. I get work 20 and 30 miles from my place of business." — Charles H. Smith.

Each Saw Filed Brings
Six More

"Each saw I filed got me six more and business has been picking up that way since a year ago. If it keeps up I will have to buy another Foley Saw Filer." — William C. Baldwin.

FOLEY FILED SAWS BRING NEW CUSTOMERS

Here is a steady repeat CASH business that pays up to \$3 to \$5 an hour, and you can start in your own basement or garage in your spare time. Every saw you sharpen with the machine accuracy of the Foley Saw Filer is an ad that brings you more customers. S. M. Hollingshead wrote to us: "I am doing very well with my Foley Filer, and I am glad I invested in your machinery. It is very satisfactory and works very well in the small community in which I live."

You can file all hand saws, also band and cross-cut circular saws on the Foley Saw Filer. The adjustments are simple—there is no eyestrain—and you can start right away to turn out perfect cutting saws. "The first saw I sharpened with my Foley Filer came out 100%. I think it is a marvel of perfection."—writes Clarence E. Parsons.

FREE BOOK Shows How To Start In Spare Time

"MONEY MAKING FACTS"

explains how you can get business from hardware stores, home owners, farmers, carpenters, schools, mills, factories, etc. Just think — with a modest investment, no overhead, no stock of goods to carry, you can start right in on a cash business that will help pay the rent, buy groceries, or a new car. Start now — send coupon today. No salesman will call.



Send for **FREE BOOK**

FOLEY MFG. CO., 815-7 Foley Bldg.
Minneapolis 18, Minn.

Send me free book "MONEY MAKING FACTS."

Name _____

Address _____

Best Bets For Bass

[Continued from page 173]

Lures should simulate minnows. For still water (best an hour before sunrise till an hour after, and from an hour before sunset till quite dark) I like the dipsy plugs. These are designed to imitate wounded minnows.

Cast to likely water, then let the lure lie as still as death for three minutes by your watch. This is the hardest thing for beginners to learn. They all want to reel the lure in right away and make it swim fast.

Did you ever watch a minnow so nearly dead it was surfacing? They lie still for minutes at a time. Only occasionally do they muster strength to make a feeble attempt to submerge. Fish the dipsy lures exactly as a wounded minnow behaves. Cast and let it lie with its nose out of water and the rest of it hanging under water.

After three or more minutes gently lift your rod tip—just enough to cause the plug to dip its head then bob up again to lie still once more.

Popping plugs are great medicine for bass, especially in the evenings. Cast, let lie for a few minutes, then pop by giving your rod a twitch. Poppers sometimes pull bass from long distances.

Fourth best bet is rocket trolling—and you'd better have a stout line and stout heart. Use a spoon, preferably a weedless one, and troll as fast as a five-hp outboard will drive a 14-foot boat. Drive right smack over the weed beds with your line way out. It's amazing how this digs the fish out of the weeds. You travel so fast the spoons rip right through the weeds. The second you get a strike stop the motor and grab your rod. And don't try this with anything but a good casting rod or stout trolling rod. No spinning rod yet made will stand the gaff for long.

Your fifth best bet for bass—spinning. This sport is growing in popularity faster than a field fire in a wind. All of the above lures in spinning sizes are killers. Remember that spinning is a blue-ribbon sport but it will never take the place of bait casting. It just supplements it.

Master these five simple methods of fishing and you'll get your share of bass this year—and every year. Good luck! •

Career Of "Careers"

[Continued from page 71]

elements of any game, he says, is making sure that any method of attack has as good a chance of winning as any other. To prove this characteristic of Careers he played some 700 games by himself, proving each possible method of attack and making corrections to the game when necessary.

He had an attorney make a patent search to make sure he had a patentable invention. He protected himself on the name and each part of the game by writing each phase out in detail and then mailing them to himself via registered letter. By leaving this mail unopened after it is delivered, the original date of the idea can be proved and will usually stand up in court.

When Brown felt that Careers was ready for final testing he wrote several game companies telling them about his game and the research he felt it needed. All of them eventually replied and were just "interested" but would make no definite commitments.

After the half-hearted replies from the game companies Brown was faced with the problem of what to do next. He decided to go a little further and do the final marketing and testing himself.

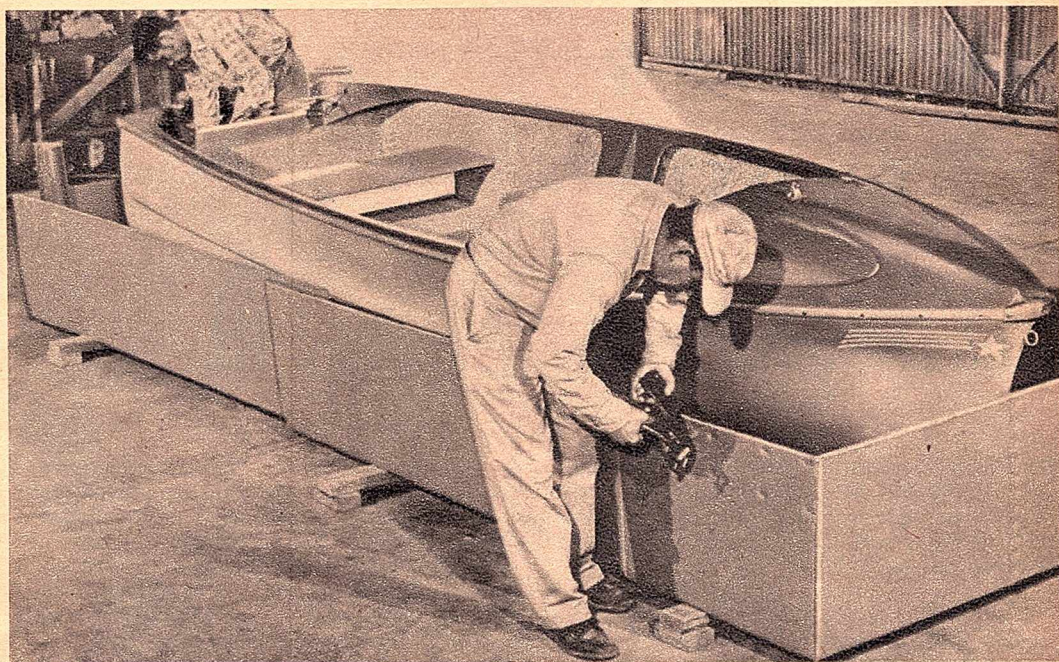
Taking his designs for the playing board, cards, and other paraphernalia to a local printer, he had 1,000 sets of the game printed.

Brown and his wife started peddling their 1,000 games. They drove from one Florida town to the next, selling Careers wholesale at \$1.50, suggesting that the stores retail them at \$3.00.

Armed with the market test results Brown sat down and wrote a 35-page report to Parker Brothers explaining how it was played, the ideas and assumptions on which it was based and the results of his market test. Ten days later—a phenomenally short time in the game business—Careers was sold.

Was all this work necessary? A Parker Brother spokesman says, "Dr. Brown's thorough approach to the invention of Careers enabled the company to reach its decision fast."

While company officials won't release the sales record of the game, Brown's future is pretty well assured. His Careers really paid off. •



Lone Star boat travels shipshape in corrugated cartons fastened with Bostitch staples

Huge stapled carton cuts boat packing time 50%

Even in Texas, where you expect things on a grand scale, a corrugated carton big enough to hold a boat is big.

A Texas boat builder wanted to replace heavy wood crates for packaging 14-foot boats. He preferred the smooth surface of paperboard, so the boats' finish wouldn't be marred. But he had to have strength enough to support the boat's ¼-ton weight. Rugged Bostitch staples solved the problem.

The carton—biggest the box manufacturer makes—arrives flat with its center seam already securely stitched with a Bostitch stitcher. Then using Bostitch staples, boat packers form the corners and join the telescoped sections.

Finally, corrugated cushions are installed and bottom and top sections stapled together—all in half the time needed to nail a wood crate.

The boat company likes the Texas-size assembly and freight savings of stapled cartons. Dealers like the way stapled cartons protect the boats. Of 3000 shipments, 2998 arrived in perfect condition. The other two were only slightly marred.

Your fastening problem needn't be this big for big savings. 800 Bostitch models save time and money in home, factory and office.

A call from you will bring one of 375 Bostitch Economy Men located in 123 U.S. and Canadian cities, who will be glad to show you how.

**Fasten it better
and faster with**

BOSTITCH

STAPLERS AND STAPLES

Bostitch, 588 Mechanic Street, Westerly, R. I.

- ☐ Please send me information on ways stapling helps shippers.
☐ Please send free bulletins that show how stapling cuts other costs.

I fasten: ☐ cartons ☐ leather ☐ wood ☐ rubber
☐ fabric ☐ plastic bags ☐ roofing ☐ light metals

Name

Company

Address

City Zone State

MAIL FOR McCAHILL

Uncle Tom is sorry he can't answer all his mail personally. In this column he'll answer the most interesting letters. Write to him at **MECHANIX ILLUSTRATED**, 67 West 44 St., New York 36, N. Y.



- *We are hoping that you can send us some information on a 1902 Baker Electric. This antique car has been willed to the museum of our small town, and nobody knows anything about it!*

*John W. Eedy
St. Marys, Ontario*

Jerry Duryea, with whom I played water polo at the New York A.C. back in the days of Daniel Boone, is the publisher of *The Antique Automobile*, house organ of the Antique Automobile Club of America. This publication is on the ball and is undoubtedly the finest independently-published automotive book in the world today. If these boys can't tell you all about the Baker, forget it—it was never built. Jerry's address is: M. J. Duryea, 17 Farmington Avenue, Longmeadow 6, Mass.

- *What did you look like as a kid?*

*Mrs. Norma Wilks
Cincinnati, Ohio*

Like a Charlie Addams cartoon.

- *Ten years from now, how many American automobile manufacturers will still be in business, do you feel?*

*Seth Brach
Detroit, Mich.*

A hundred, I hope—but the chances are 90 to one there'll be three.

GOOD TREND DEPARTMENT

Driving through Millbrook, N. Y. recently I was very impressed by a huge sign displayed as you enter the town. Unlike Southampton, L. I. and other corny New York municipalities that blatantly announce via signs: "This is It—No Excuses—Radar Traps, Speed Electrically Timed" and Connecticut's license-lifting ads, the Millbrook sign reads in large letters: "No Speed Traps" and underneath, "Because fair-minded drivers obey our requests." Then there is a discreet series of

20 and 30 mph signs. Though I was doing close to 40 mph, I immediately slowed down to the requested speed and I believe a lot of others will react the same way. A few minutes later in Connecticut, in a 40 mph zone, I and several other drivers were pushing beyond 50 mph with eyes glued to rear-view mirrors. American drivers don't get told easily but as a general rule are the most cooperative in the world when asked nicely.

- *Tom McCahill's articles may be of interest to hot-rod killers who did away with two of my friends (a dog and a cat) but I still can't appreciate all this horsepower. Let them keep it on the track. Through Tom's article I found the Rambler a natural for me. A 190 hp V8 gives all the deliverance anyone could request and gives you peace of mind. I like to drive in accordance with the Safety Council's limits and enjoy life. Happy Holiday to you all—or send me your policy.*

*Howard B. Crane
Danbury, Conn.*

Goody for you, Howard.

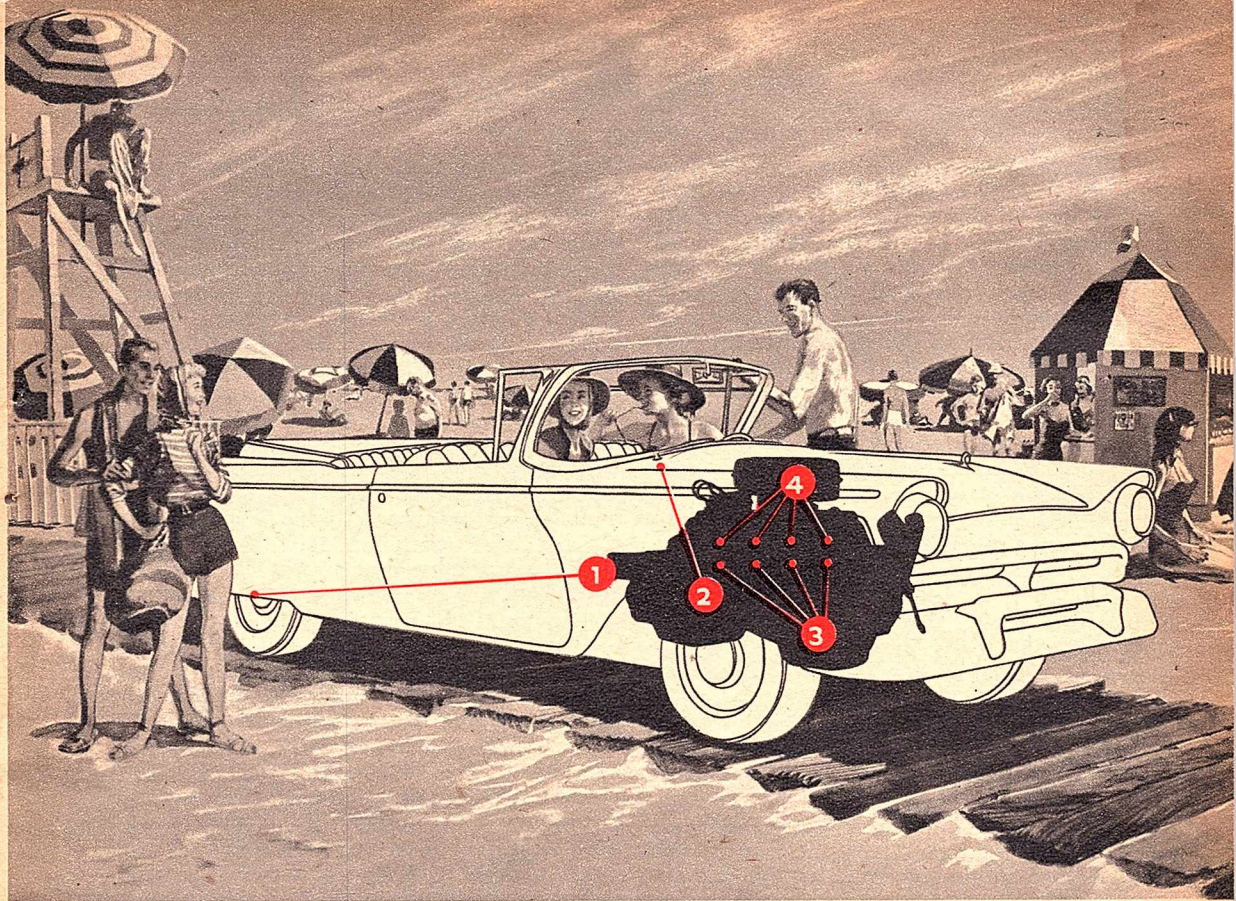
- *Are you for legalized drag strips or aren't you? Answer yes or no.*

*Bill Peters
Denver, Colo.*

Yes. I've been plugging for legalized drag strips for over ten years. Give a guy a place to shoot off his elephant gun and the chances are he won't blow your head off with it on Main St.

- *Recently I took delivery of my new car that cost almost \$4,000 and set out for a short trip the next day. In the first ten miles the sun visor fell off. Thirty miles from home I stopped for a traffic light and when the light turned green, the car refused to move. It*

[Continued on page 178]

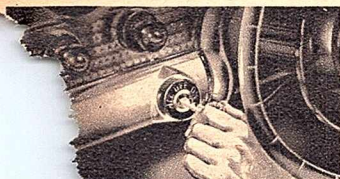


1 **More road horsepower**—Tests by independent engineers proved new Champions give cars of all makes an *immediate* boost in road horsepower—the real power actually de-

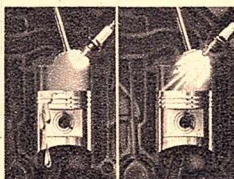
livered at the rear wheels. Most cars gained from 6% to 31%! No wonder 9 of 11 cars that broke the Indianapolis speed record this year were powered with Champion spark plugs!

If you haven't changed your plugs in about 10,000 miles—

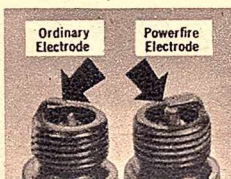
You can make your car 4 ways newer with Champion spark plugs



2 **Quicker starts**—Tests with cars whose plugs had gone 10,000 miles or so show that new Champions can cut starting time by as much as 71%—with an average of 39%!



3 **Less engine wear**—Old, misfiring plugs (left) dilute oil with raw gas. New, full-firing Champions (right) protect the oil. *When you change oil, check your spark plugs!*



4 **Lower cost-per-mile**—As photo above shows, Champion's great new Powerfire electrode stands up better than ordinary types under same use. Insist on 5-rib Champions!



CHAMPION

LOOK FOR THE 5 RIBS

Mail For McCahill

[Continued from page 176]

would back up but wouldn't go forward. This ruined my weekend, and the dealer let it be known that he was doing me a big favor the following Monday to tow the car back to his service station. This did not pay for my taxi fare back or weekend garaging. The fault was a simple adjustment and the dealer told me it was caused by sloppy work at the factory. In the next 1,000 miles one of my electric windows stuck, the cigar lighter failed to work and a loose fitting at the oil filter caused me to lose nearly all my oil. If I ever get this car right I'll run its wheels off before I get another. Many of my friends have had similar experiences with new cars. Can't the factories do something about this?

J. B. Edgar
San Francisco, Calif.

Quality control in American factories has now hit an all-time low. The majority of cars delivered today reflect a don't-give-a-damn attitude by the assemblers. This is caused by several factors. Most assembly lines are supervised by production foremen attempting to hit production quotas in order to obtain top management recognition and possible bonuses. The actual worker just gets an item partially screwed on when the entire unit is moved to another position on the line for additional assembly.

If your unit happens to be in the process of being built on, let's say, a Monday and the guy screwing on your molding or other component has had a rough, red-eyed weekend, he may miss the hole entirely and let it go at that. However, the production foreman has to keep things moving and vaguely hopes that any sloppy workmanship will be caught by the check inspector who, in a big production line, pulls a sample off the line once or twice a day. If it slips by this scanty quality control point everyone hopes the dealer will fix it.

Trying to pin down the responsibility (aside from management which has the full responsibility) becomes quite a puzzle. Was the worker who was supposed to tighten the bolt but didn't because of time, pressure and awkwardness, responsible? Was it the production foreman, driving too hard for a bigger day's output? Or was it management's fault for demanding too much in too little time in order to beat out the competition? Possibly all of these. But then let's not overlook the dealer—and maybe even yourself. Right in your bill of sale, if you examine it, you will find service charges running all the way from \$40 to as high as \$75 or \$80 which the dealer

collects under the term "Conditioning" or other misleading nomenclatures.

Now, assuming you are a lily-white customer who had no rusty heap to trade in and didn't ask a dime discount, and your new car fell apart—then it was the dealer who robbed you just as surely as if he picked your pocket. Let's assume his "Conditioning" charge was \$60. At this price the dealer could afford to put a first-class mechanic on your car for almost three full days, doing nothing but making sure that every single component was tight and well-fitted, all accessories working and all missing bolts, screws, clips and other gizmos correctly installed. You, as the lily-white customer, have paid for this and if you don't get it you've been robbed.

However, assuming your Grandfather ran a shell game and your Grandmother peddled hot rugs at the local fair, you may deserve exactly what you got. Supposing the car you traded in was a real load and by shopping around from one dealer to another you finally did business with the one who went farthest overboard. This dealer was able to go overboard only by shaving his own costs, such as completely eliminating your "Conditioning" even though it appeared on the bill of sale. Or, in another case, you didn't have a trade-in but got the dealer to beat off several hundred dollars from the regular price to make a so-called "clean cash" deal with you. Here again he has to shave his costs, including paying a mechanic to give your new car a final check-up. When you make a fancy trade-in deal or buy a new car for cash way under list price, you are gambling that the manufacturer made *this* one right. You bled the dealer to the best of your ability before buying so he has a very small sympathetic ear when you start crying. If you *are* the lily-white customer who paid full price, then and only then, have you the right to load your shotgun for the purpose of crashing the salesroom with both barrels blazing. In the meantime, if you've got a good car, keep it. But don't expect to own a good new automobile 'til the car's gone at least 5,000 miles, for this is about the time required today to thoroughly de-bug them.

● I know a guy who works in a gas station who's so dumb he thinks fixing a flat is redecorating an apartment. Can you top this?

Jack Blair
Baltimore, Md.

Who wants to?

● *This might be a good tip for your readers. I operate a service station in Jamaica, Long Island, and often wonder why so many people wait until it's raining hard to come in for a grease job. Our men are paid all right but believe me, when they have to stand under a wet, dripping car they won't do near as good a job as when it's dry.*

K.L.B.

Rockville Center, N. Y.

Thanks. This is a real tip and I for one wouldn't blame the grease monkey if he just gave a car a lick and a promise while getting diluted mud drippings in his eye.

● *My 1957 American car came with an Instruction Book that has less information in it than a blank page. It doesn't even tell me the horsepower or the wheelbase but gives all kinds of instructions that don't work on how to operate a six-way power seat—which my new car hasn't got. Do any American cars you know of have decent instruction books? If not, why not?*

P. O. Carruthers
Chicago, Ill.

There is no American car made that comes with a readable and intelligent Owner's Manual that I know of. Most of them are filled with trivial poop, apparently edited and written by the poor relations of company execu-

tives. When a car such as the Volkswagen or any import supplies an instruction book crammed full of information, it seems pretty much of an insult to American intelligence to hand out the present type of literature coming from Detroit. There seems to be a fantastic shortage of technical writers who can write in understandable English. Your kid got a better instruction book with his Lionel train or Daisy air rifle than his old man gets with a \$7,000 barouche. I'm surprised that top company executives have allowed their publishing departments to slip so much.

● *I got a screwy idea: why not put big shielded-from-the-sun mirrors on tough curves so that you could spot an approaching car coming from the opposite direction long before you yourself are on the curve.*

Bobby Herbert
Los Angeles, Calif.

It's not a screwy idea at all. Palm Beach has been using a two-way mirror on a tough curve for years.

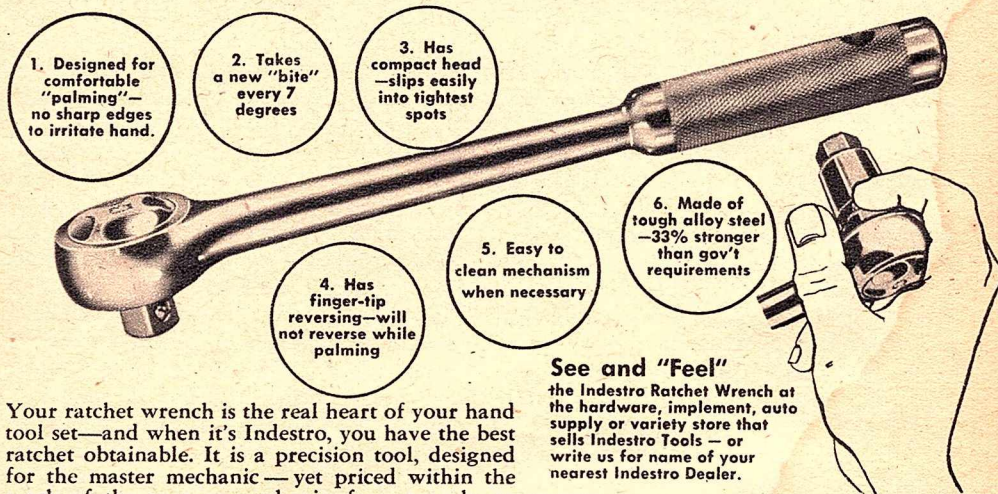
● *Didn't you used to wear your mustache longer?*

Vern Brande
Seattle, Wash.

Than what?

—Tom McCahill ●

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The Pontiac Safari

[Continued from page 90]

fine as any in the industry, they also constituted my first beef against the car. Our test wagon did not have the six-way electric seat but the quaint back-and-forth-on-rails type which is operated by your leg muscles while pushing on the release button. I found that this seat pushed all the way back didn't provide enough leg room for a bow-legged jockey, a common Michigan fault of recent years. It would appear that the Detroit design boys never read the Wheatie commercials which prove that Americans are growing taller, not more compressed.

This leg room was much too short for me and in order to bring you a fair test of the car, McCahill Associates yanked out the front seat, put the rear seat in full floor position, and found the rails could be moved back a full inch and a half, even with the rear seat fully down. Some fast drilling and the front seat was re-installed. This operation took less than an hour and made all the difference in the world for any driver six feet tall or more.

Seat comfort is one of the major safety factors in any automobile making trips of several hundred miles or more. Unless the driver is comfortable, he will tire much more quickly and this fatigue brought on by a poor seat can possibly turn a good driver into a road menace after a number of hours at the wheel. Race car builders have known this for years and even on Indianapolis cars you'll find some of the finest examples of upholstered comfort seats imaginable.

When Briggs Cunningham was building cars for the LeMans race a few years ago, the seats in his cars averaged \$600 a pair and were worth every penny of it. I was in Cunningham's pit at LeMans when he got out of his car after 19½ hours of straight high speed running. If he had been uncomfortable due to either cramped leg room or a poorly designed seat, such a feat would have been impossible.

With the seat re-positioned, the Safari (even for 6' 4" McMichael) proved as comfortable on long test trips as spending two weeks in a French featherbed. While still on the comfort kick, let me state for all you guys and gals who think you have it made with inner springs and foam rub-

ber—a good French featherbed makes sleeping on these New World innovations seem like tossing on a board floor.

When we started our test of the Safari (which lasted for over 2,000 miles) the weather was hot and humid. This job had air conditioning that emerged from two movable chrome ducts that you could direct at your feet, middle, up your nose or over your head. The blast is cold enough to firm up a dripping Popsicle and when set to full bore and aimed at your face, has enough force to flatten your eyebrows so they look as if they had a crew cut. On one hot weekend I took the Safari to a low marsh where field trials were taking place. The temperature was over 90°. The air conditioner not only kept me cool as the outside of a frosted julep glass but kept my dogs as full of pep as an economy-sized tin of nitro. This was really living it up. No king or sultan ever had it better—or even as good.

One great thing about air conditioning that those who've never had it in a car may not realize is the mental comfort it gives. Guys like me, who have to travel over much of the country regardless of the weather, including some of the hottest spots on earth, get almost as much comfort out of their air conditioning even when it's switched off. The fact that you know it's there, and no matter what happens in the line of heat waves all you have to do is turn a switch, is a comfort in itself when you start out for the hotlands in mid-summer.

For me, the big gizmo with the Safari is that this car, not the most expensive station wagon on the market by a long shot, has more to offer for more people. For example, let's say that you, the Old Man of the family, need a car for business trips and, in addition, to serve as a fun car for hunting or fishing jaunts. You could pack guns, rifles and enough camp equipment in this job for a Teddy Roosevelt outing. On the deluxe baggage racks on top you can haul food, huge tents and any prize elephant hides you might collect.

The Safari wagon will also look just as normal when you drive to the plant for a board meeting and may give you just a dash of swashbuckle you'd fail to get from

a sedan. Your wife will get all the luxury from this beautifully appointed rig that she would from the most expensive sedan of the line—and she'll find it perfect for hauling home antiques Uncle Josh just whipped up in his workshop.

Junior can also get a lot of shirt button-popping out of this bucket—unknown to you, of course. With the Safari's fire-eating engine that sent the competition running for the storm cellars at Daytona, none of the local boys are going to embarrass Junior when he turns up at the drag strip instead of at the church formal where you thought he was heading. As a matter of fact, unless your swashbuckle has been completely corroded, it won't do your ego one whit of harm to be able to dig away from all the competition when the light turns green on your way to the office.

Here is a car loaded with luxuries, as versatile as money, that doesn't have to give way in any department. It has more than 110 mph top speed, it can do 0-60 in under nine seconds and it's big enough to carry you and three or four pals on a hunting trip to the Canadian wilds or the jungles of southern Mexico. Here is a vehicle equipped to take on jungle heat as well as Canada's wintry blasts. The steering is not the best power steering in existence and the cornering, though good, is not outstanding. But the Safari is fast enough, fully loaded with moonshine, to outrun the revenooers and it's comfortable enough, providing you installed plumbing, to move into permanently.

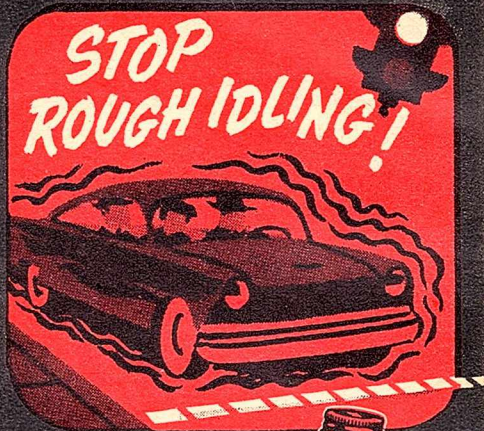
In summing up, when I predicted several years ago that more station wagons than sedans would be sold by 1960, it was this type of all-around station wagon I had in mind. Here is one that's functional, fast and with a bargeload of lush. The only thing it lacks is a glove compartment loaded with \$1,000 bills. •

Test The Simca

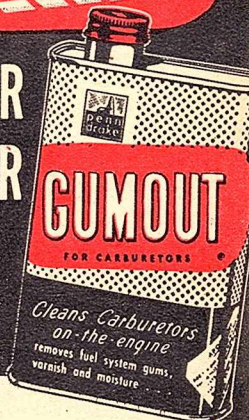
[Continued from page 94]

four-speed gearbox. I was completely flipped by the torque in all gears of this little engine which displaces only 79 cubic inches. Its fourth speed pull, even at low speeds, is almost American and makes this an extremely pleasant car for a lazy driver to handle. Though it might be frowned on by the double-breasted vest set, on

[Continued on page 182]



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Test The Simca

[Continued from page 181]

level roads you can drop to 10 mph in top gear, put your foot down and take off without any bumps, coughs or shudders. It gets from 0-30 mph in 6.4 seconds, and up to 60 mph in 20.2 seconds. It's flat-out just after you pass the honest 80 mph mark.

What I liked about this car was that, though it didn't have real drag strip performance, it did everything so easily and quietly it was a real pleasure to drive. There was no ear-splitting high rpm clatter and no whipping-the-engine-out-of-the-chassis-feeling at any time. This was a housebroken, comfortable piece of machinery that not only reminded me from the inside of a 1940 Chevy but was pretty similar in performance. The foam rubber seats were equal in comfort to any American offering and the ride over the roughest test roads was remarkably good. On hard turns and gravel bends the Simca grooves like a bowling ball going down a laundry chute.

When I test an off-beat offering such as the Simca I always ask myself what I'd do with it if somebody left me one in exchange for a case of beer. During such arduous mental exercises I try imagining this is the only car I own, I make \$36 a week and have to drive from New York to California to fetch dear old Grandpa who's being sprung from Alcatraz. For this imaginary trip I'd have no fears at all about starting out in the Simca and actually feel it would be a pretty pleasant ride. This car has real comfort, is nice and friendly to handle and my fuel bill would be negligible, comparatively speaking, as it could easily get from New York to San Francisco and back again on less than 200 gallons of regular gas.

Cruising speed would be about 55 mph, though this could be raised to 60-65 mph without any harm whatsoever if your spaniel was about to have pups. The real comfort range, however, is 55 mph. At this speed, 12 or more consecutive hours at the wheel wouldn't prove any harder than spending the same time in your favorite chair at home. At 60 mph and above, this small car gets a little nervous and must be watched. When doing 80 mph it gets outright lively.

A phenomenon that the safety boys might have a glib explanation for is the road characteristics developed by all family-type cars, depending on weight and engine ability. The closer any car comes to its peak output, not only in horsepower but in out-and-out speed, the closer the car comes to being a dangerous handful. For instance, 80 mph in this Simca feels just as fast and as sporty as 120 mph in a big Chrysler or 150 mph in a sports car capable of such performance. This is true whether you're going down the sand at Daytona Beach or a modern turnpike at dawn.

When an engine and chassis reach their all-out point they develop a feeling similar to driving any car at 60 mph over glazed ice. That's why, as we pointed out on these pages over a decade ago, as a rule-of-thumb the *comfortable* cruising speed of any automobile is roughly three-quarters of its maximum speed. For this reason, a 120 mph car is a lot safer to drive and handle at 80 mph than a car that has a top speed of 85 or 90 mph. At 65 mph the driver of a Volkswagen is experiencing the same sensations that an Imperial driver gets at over 100 mph—he's working hard or he's a lunatic. By this reasoning the top comfortable cruising speed of the Simca should be 60-62 mph. At 55 mph it's as easy to drive as receiving money from home.

The success or failure of the Simca in this country depends on public acceptance. Right now, sparked by the VW and the Nash Rambler, quite a healthy percentage of new car buyers are interested in smaller cars for several reasons. Disregarding fuel economy (an important asset), smaller cars are far easier to whip in and out of traffic than Michigan monsters, are easier to park and many feel are safer because they are easier to maneuver out of trouble. Another big class of small car buyers are the guys who want a second car for going to the station, local shopping or as transportation for Junior who is just beginning to shave and feels he drives like Tazio Nuvolari—though his old man doesn't quite agree.

Perhaps the most important customer of all is the former buyer of used cars.

With many models of our low-priced three (as they are laughingly called) pushing the \$4,000 mark today, they are way beyond the means of thousands of would-be new car buyers. So this buyer shops around for a good second-hand car. His neighbors and his pals know he is driving a second-hand car. In this day of plenty it often ruptures the social ego of the household.

In the low-priced imports the former used car buyer can find a brand-new offering at second-hand car prices and, with the addition of a cap and some sports car lingo, can pass himself off as an automotive connoisseur and not just another guy who didn't have the price. There are thousands of these people. For such a buyer the Simca Aronde will be a pretty hard bucket to beat—with one or two ifs. The ifs are as follows:

Simca is not a Johnny-come-lately company but an old-line firm of good reputation which will be here for many years to come, providing somebody doesn't drop a bomb in the wrong place. Their current plans call for huge promotion of Simca products in this country. If these plans materialize there will be no service or parts problems and this would make the Aronde one of the best buys in automobiles; dollar-for-dollar, that this writer has seen in many a moon. If, however, plans should fail to work out, and service and parts are sketchy, the "good buy" part would become "goodbye" in my book.

If all things were available today, meaning parts and service, I feel this car is worth a good deal more than the extra \$200 it costs over the Volkswagen. It has more room, more push and dragability and, in addition to all this, it has full reclining seats so that in a money pinch on that coast-to-coast trip you could sleep in the car all the way. This is a great car and deserves to succeed. I personally hope it will. •

Preview Of 1958 Cars

[Continued from page 66]

able to get the car moving from a standstill or up a hill at an adequate speed in direct drive and then (through a simple, infinitely variable fluid coupling) propel it at desired cruising speed.

There will be much more than power,
[Continued on page 184]

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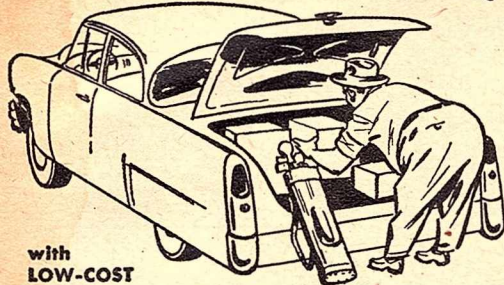
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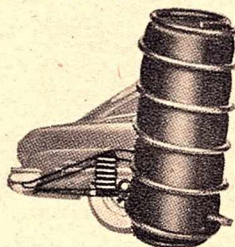
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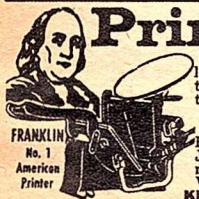
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Preview Of 1958 Cars

[Continued from page 183]

of course, in the 1958 engine story. More cars will offer fuel-injection; 1957 was simply a semi-experimental curtain-raiser. The price of fuel-injection systems, too, may come down a little as a result of increased production.

You've been hearing more and more about gas turbines as vehicle engines but mostly in truck application. Take it for granted that those are preludes to passenger car use. But gas turbines aren't likely for 1958. There are still some bugs to lick—high fuel consumption that balances cheaper fuels usable, problems in acceleration, etc. But the day of the gas turbine-powered automobile may not be too far away—if something new doesn't get in its way.

That "something new" is an old friend of engineers all over the world—the free-piston engine. Maybe you've heard of it as the "bounce-piston" engine. The concept is simple. An explosion is induced in a chamber whose two ends are movable pistons. The combustion drives the pistons apart. Their far ends compress air behind them and this compression in turn drives the pistons back toward each other. Meanwhile, more fuel has been blown into the combustion chamber and the heat created by the pistons coming together induces a new explosion. And so on.

The reciprocating motion of the horizontally opposed pistons is transformed into rotational movement—a driveshaft, in the case of the auto.

Engineers have been trying to design a foolproof free-piston for years. Last summer General Motors reported creation of a 250-hp unit, built of two pairs of horizontally opposed pistons, which may be feasible for automobile engines as well as other applications.

Since then nothing has been heard of this novel powerplant. But there are vague rumors floating around Detroit of extensive cross-country testing, not necessarily in an automobile, that is proving the GM free-piston engine to be one of considerable flexibility, considerable economy (it burns anything from peanut oil to airplane gasoline) and considerable low production cost (it lacks many of the conventional, closely-fitted parts of an automobile). It is not inconceivable that

while General Motors has been talking about gas turbine developments in public, it has been doing its most important work on the free-piston powerplant.

Whatever the 1958 engines, there will be more of them hooked up to anti-spin differentials at the rear. Packard pioneered this idea a few years ago; Chevrolet offered it earlier this year and more will follow suit.

Attention is being given to problems of door closing—both the physical aspect of reaching across a wide seat to do the job and the somewhat different physical problem of slamming a heavy door. Electric buttons which open and close doors, operable from the driver's seat, are being studied. So is a new European development which might be used in conjunction with mechanical closing—a kind of spring arrangement at the bolt which in effect makes the door shut itself securely once the closing action has been given a comparatively gentle beginning.

Atop these mechanical improvements for 1958 will be interestingly redesigned bodies. Most attention will inevitably attach to the Edsel, the new offering of Ford, due for fall announcement, which will bracket the entire price field with four lines ranging from Ford top price almost all the way up to Lincoln.

Broadside, the Edsel looks a good deal like this year's Mercury, especially in the rear-fender treatment. But from the front it has a distinctly European flavor, achieved mainly by a new grille which reminds some observers of the Italian Alfa-Romeo. From the rear the Edsel should be different enough—largely because of its unique taillights and bumpers—to be recognized without much trouble.

Public announcement date for the Edsel is August 27, the same day on which September MECHANIX ILLUSTRATED goes on sale with complete details and pictures of the car and a road-test by MI's celebrated Tom McCahill. (Don't miss that issue, it's a lulu!—The Editors.)

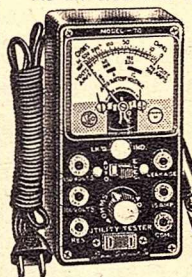
Other rumors percolating out of Dearborn are that Lincoln will lead off in 1958 with what is expected to be a fairly broad trend by 1959—integrated body-and-chassis construction. Nash and Hudson were the trailblazers in this direction. Some industry thinking is that the more expensive cars must be the leaders in integrated con-

[Continued on page 186]

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Preview Of 1958 Cars

[Continued from page 185]

struction as the cost of repairs after a small collision become expensive with such construction.

In 1958 the trend toward lower bodies will continue. Some of the 1957 models, notably those of General Motors, did not go as far as the average in this respect; next year they will make up for lost time. Chevrolet and Pontiac are expected to have new bodies—and definitely lower ones, three to five inches below present models.

As lower cars are developed, the various makers may find it necessary to extend door openings farther into the roof than heretofore. Some prophets have looked at the beading lines on such models as the 1957 Olds and Buick and deduced that they will be the dividing point where forthcoming doors will reach into the roofs. It might prove true.

Fins will continue in evidence and likely will be more noticeable on General Motors lines than in 1957, if only because of the relatively greater success of the higher-finned competitors of GM during the past months.

It goes without saying that dual front headlamp treatment will be practically standard everywhere in the industry in 1958.

So that's the way the '58 models stack up at this writing. The big news will be air-suspension, fuel-injection, increased hp engines, lower bodies and larger glass areas. The car that will probably get the lion's share of publicity will be Ford's new Edsel—but you can bet General Motors and Chrysler have a few tricks up their engineering sleeves to attract the customer who is looking for the new and the unusual in his '58 car. •

Could You Be A Hero?

[Continued from page 55]

experts can give you the same definition of courage. But on this they all agree—there's no such thing as a born coward or a natural hero. *Nor is it true that anyone can be a hero!* As a matter of fact, some experts believe that most of us would shrivel up in the face of danger.

Shocking? Not to a man like S. L. A.

Marshall, a former Army brigadier general who is rated as one of the world's best analysts of army combat operations. Marshall says most infantrymen won't "ever strike a real blow" against their enemy unless their officers and leaders constantly "ride herd" on them. He estimates that even among seasoned troops you can expect 75 per cent of the men "will not fire or will not persist in firing" against the enemy. "These men," he says, "may face danger but they will not fight."

But if a man is not born brave, can't he be taught to have guts? That's a lot of bunk, too, according to world-famous psychiatrist Dr. Joost A. M. Meerloo. Remember the howl that was set up when some newspapers ran photos of men in the armed forces undergoing real torture at a "survival school" to learn how to resist brainwashing?

"Ridiculous," Dr. Meerloo called it. "A man cannot be forced to become a hero." He adds, "The hero at school can become a weakling as soon as he is faced with the real challenge."

Dr. John Dollard, who interviewed hundreds of combat heroes starting with veterans of the Spanish Civil War right up through World War II, says 85 per cent of them had admitted to having been frightened. "Only a fool," says Dr. Dollard, "is not afraid if there is something to fear." His advice? Don't suppress fear. Deal with it intelligently, openly, even crack jokes about it.

Actually, psychiatrists have no exact means by which they can determine in advance whether you've got the makings of a hero or whether, faced with a dangerous situation, you turn tail and run. But ever since World War II and the Korean conflict the subject of what makes a man brave has come under intensive scientific scrutiny.

When I got to Washington, D. C. in my quest for talks with experts, I ran into one of the most unique research projects ever undertaken in the history of fighting men. The project is now in its final testing stages but it began when a team of Army researchers, including several leading psychologists, went into the battle zones of Korea from May 13 to June 30, 1951.

Armed with questionnaires and tape recorders they interviewed more than 5,000 combat infantrymen, often with shells flying overhead. A second team

went back later to conduct a similar study, this time covering some 2,000 front-line men. Their aim was to find out what made some men "combat desirables" and others "combat undesirables" and then come up with some kind of test by which the armed forces could pick the best combat men *in advance*. You might say the experts were after a "hero prediction" test—although that is a term they frown upon.

The Army doesn't want heroes necessarily—just combat soldiers who won't shrivel under fire, who won't drop their guns and run for cover while their buddies are shooting back. Can a test pick out these fighting men in advance? Yes, say the experts, because we all react according to our total personalities.

Just what the test will consist of is a guarded secret. The Army doesn't want anyone wiggling out from under. But studies so far show that the man who stands up best under fire has these elements in his personality and background:

1. He was active in body contact sports.
2. He loves the outdoors.
3. He doesn't mind being alone.
4. Without being bluster, he has self-confidence.
5. He can think fast and make fast decisions.
6. He likes to do a lot of things and is always busy.
7. He has respect for social obligations and a sense of responsibility.

Does this mean that someone with all these qualities in his personality is a sure-
[Continued on page 188]

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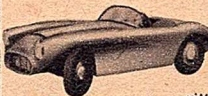


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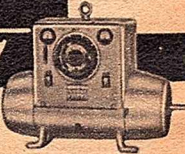
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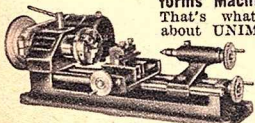
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Could You Be A Hero?

[Continued from page 187]

fire candidate for the Medal of Honor? Definitely not. Psychology, unlike mathematics or chemistry, is not an exact science. You can't always add up two and two in a human being and get four. But you can usually come up with a pretty good batting average and that's what the Army's psychologists are hoping for.

Meanwhile, if you never get a chance to be a hero don't let it bother you. You can go on thinking you've got the stuff of a hero in you. But just hope you're never called upon to prove it because the facts are clear—not everyone can be a hero when the chips are down! •

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Match your answers on the Courage Quotient Test with the scores given below. Then add up your total number of points.

Question	Agree	Disagree	Your Score
1.	10	5	5
2.	5	10	10
3.	5	10	10
4.	5	10	10
5.	10	5	10
6.	10	5	10
7.	10	5	10
8.	10	5	10
9.	10	5	10
10.	5	10	10
11.	10	5	10
12.	5	10	10
13.	5	10	10
14.	5	10	10
15.	10	5	10
16.	5	10	10
17.	5	10	10
18.	10	5	10
19.	10	5	10
20.	10	5	10
21.	10	5	10
22.	5	10	10
23.	5	10	10
24.	10	5	10

Your total score **190**

If your score is above 180 your Courage Quotient is excellent. From 180-140: average. If your total score is below 135 your potential for being a hero when confronted by danger is poor.

The Most Of Everything

[Continued from page 105]

announce in Gilhooley's Gaelic Interlude Bar and Grill, and Wham! you're into it.

A number of facts listed in the GBOS are only the starting points of discussion—for instance, the longest-boiling egg. It's the ostrich egg and the GBOS says it takes 40 minutes to boil. Hard or soft?

Longest English word in the Oxford English Dictionary is floccinauchinihilipilification. Look it up.

In the ever-popular field of crime, the most productive murderer was Herman Webster Mudgett who did in an estimated 150 women in Chicago in the last century. Biggest robbery was of \$9,878,400 worth of gold bars from the German National Gold Reserves in June, 1945, by U. S. military personnel and German civilians. The biggest bigamist was Mrs. Theresa Vaughn of Sheffield, England, who confessed to 61 marriages in five years. The book with the most superlatives is the Guinness Book Of Superlatives, \$2.95, published by Superlatives, Inc., 275 Madison Avenue, New York.—Harvey Gardner •

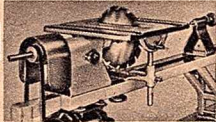
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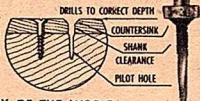
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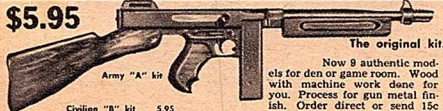
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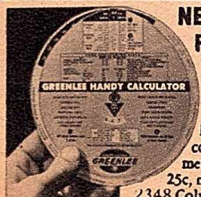
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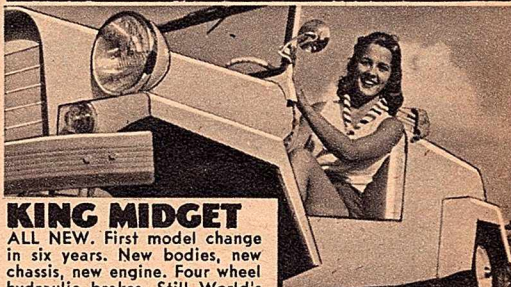
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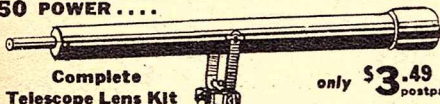
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Train Your Dog

[Continued from page 103]

learn he can get away without obeying.

Gun shyness can be overcome in some dogs but it's not always possible. One method is to start making loud noises at a distance while the dog is eating. Gradually, over a period of days, move in closer.

I don't believe in giving dogs tidbits during training sessions. Their reward should be your praise and their sense of having pleased you. Never, never let yourself become impatient with a dog. Your anger can only instill fear and belligerence in him. Go at the training with the idea that this is something you and the dog have to work out together. You have to learn and understand and respect each other—no matter how dumb the other one may seem at times. And through it all, you have to be the boss. Once you understand your dog and yourself you've mastered the most important part of scientific dog training. •

DON'T DO-ITS



August, 1957

Meteors And Comets

[Continued from page 153]

side of the earth is heading straight into the passing meteors. This holds true anytime; there are invariably more shooting stars seen in the late night and early morning hours.

You can take pictures of meteor tracks simply by securing your camera firmly on a tripod, facing it east, and opening the shutter for a time exposure. As the earth rotates, curved star trails of course record on the film, but any present meteors will usually make heavier, oblique paths.

Major astronomical observatories maintain patrol cameras to detect comets on photographic plates before they reach the earth. For the rare bright ones, a long exposure is necessary to get good pictures.

The telescope used by the observer on pages 152 and 153 was specially designed by the Smithsonian Institute for tracking and checking the time passage of the man-made satellite to be launched some time within the next twelve months. Two of its important features are a wide-angle eyepiece and construction which permits easy sit-down observation. The commercially made model is now available from Edmunds Scientific Corporation, Barrington, N. J.—*Peter Leavens*

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Using a battery-powered outboard motor, this handsome model really performs beautifully. Construction is mostly of balsa, with plywood added where extra strength is required. For your copy of these complete, full size plans, remit 50 cents to MECHANIX ILLUSTRATED Plans Service, Fawcett Bldg., Greenwich, Conn. Please specify Plan No. 420.

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4 1/4" "Palomar, Jr."! Up to 270 Power. A fine Reflector Telescope complete with real Equatorial Mount and Tripod. Aluminum tube, 4 1/4" dia. mirror, rack and pinion focusing eye-piece holder, 2 eyepieces and mounted Barlow Lens for 40X, 90X, 120X and 270X. Shipping weight approx. 25 lbs.

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See a thrilling spark display as you set off a miniature bolt of lightning. Absolutely safe and harmless. Stands 14" high, 9" plastic discs rotate in opposite directions. Metal collector brushes pick up the static electricity, store it in the Leyden jar type condenser until discharged by the jumping spark. 24 page Instruction Booklet included.



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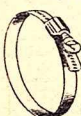
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50 Power MICROSCOPE and 10 Power TELESCOPE

Useful Telescope and Microscope combined in one amazing, precision instrument. Imported! Telescope is 10 Power. Microscope magnifies 50 Times. Sharp focus at any range. Handy for spots, looking at small objects, just plain snooping. Send Check or M.O. Satisfaction Guaranteed.

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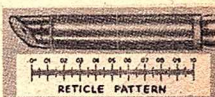
Very handy around the house and shop. Hold wire fence to posts. Join and hold pipe and connectors; join flexible tube to rigid pipe, male and female connectors of all kinds. Use to stop leaking seals even in corrosive solutions. Adjustable from 3 1/2" to 4 1/2". Original cost 65c each. War Surplus—200,000 units available (write for large quan. prices).

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Fountain pen size, makes direct reading measurements; for checking small parts and dimensions under powerful magnification. Precision, glass etched reticle calibrated for measurements up to 1/10" by .001" divisions.

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BUILD A SOLAR ENERGY FURNACE



A fascinating new field. Build your own Solar Furnace for experimentation—many practical uses. Easy! Inexpensive! We furnish instructions. This sun powered furnace will generate terrific heat—2000° to 4000°. Fuses enamel to metal. Sets paper aflame in seconds. Use our Fresnel Lens—14 1/2" diameter . . . f.1. 14"

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Imported! The color-corrected, cemented achromatic lenses in the objectives give you far superior results to the single lenses found in the microscopes selling for \$9.95! Results are worth the difference! Fine rack and pinion focusing.

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SIMPLE LENS KITS! Fun for adults! Fun for children!

Kits include plainly written, illustrated booklet showing how you can build lots of optical items.

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Complete Line of Astronomical Telescope Parts and Assembled Telescopes. Also huge selection of lenses, prisms, war surplus optical instruments, parts and accessories. Telescope, microscopes, binoculars, etc. Request Catalog "B"!

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EDMUND SCIENTIFIC CO., BARRINGTON, N. J.

EVENING

JUNIOR BUILDING PANELS



FORTS and barns and bridges are just a few of the many constructions an imaginative youngster can assemble with scrap strips of Masonite's $\frac{1}{8}$ -inch Tempered Presdwood.

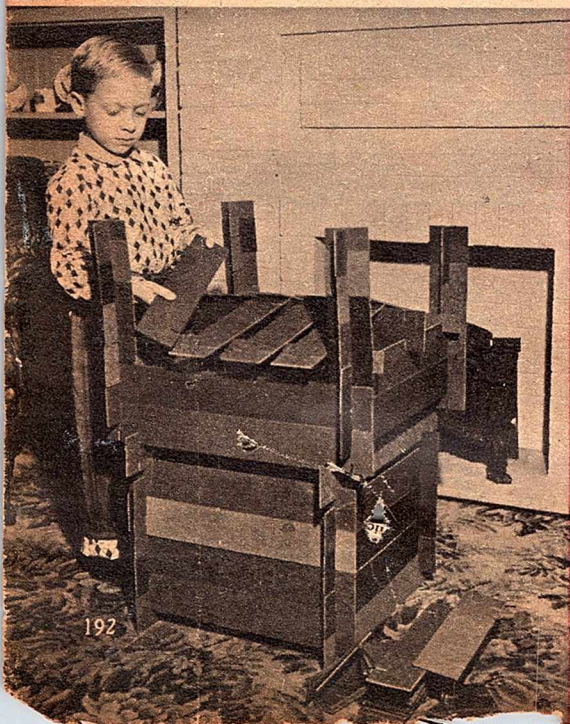
The "building materials" consist of a few dozen of these strips cut—preferably with a power saw—to uniform lengths and widths. The panel notches,

by which the strips are fitted together, are cut $1\frac{1}{2}$ inch from the ends and are $\frac{1}{8}$ inch in width and $\frac{3}{4}$ inch deep.

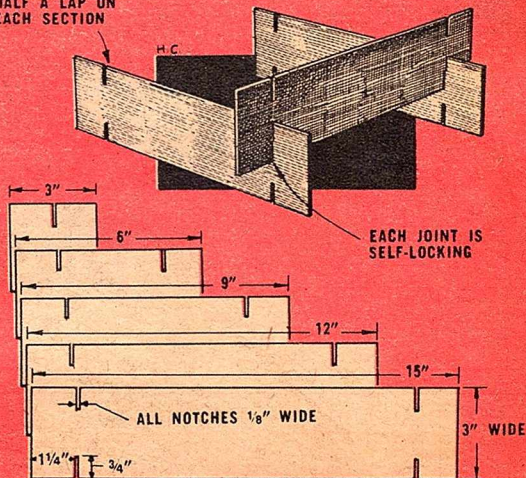
A set of these panels cut to a number of uniform sizes makes a sturdy building kit that takes up little storage space.

For a more festive appearance and to further delight the kids, paint the panels in colorful hues. •

TURRETED FORT is completed by youngster. Drawing at right shows how panels are cut.



$\frac{3}{8}$ " DEEP NOTCHES
PERMIT EXACTLY
HALF A LAP ON
EACH SECTION



PRINTED
IN
U.S.A.

AUGUST MECHANIX 1957

HE JUST DOESN'T HAVE IT!



I OVERHEARD THE BOSS TALKING ABOUT ME—FRANK SMITH! THE WORDS HURT. BUT DEEP DOWN I KNEW THEY WERE TRUE.

I'D WATCHED OTHER YOUNGER MEN MOVING AHEAD, GETTING RAISES...THE GOOD JOBS. WHY WAS I BEING LEFT BEHIND?

GEE—ANOTHER PROMOTION JIM? CONGRATULATIONS!



THANKS, FRANK. SORRY YOU'RE NOT COMING ALONG, TOO.

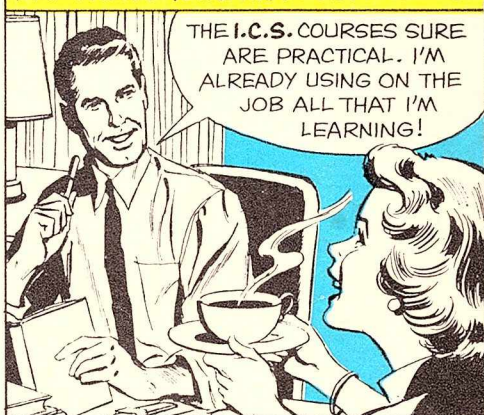
THAT NIGHT I FELT DESPERATE. THEN MY WIFE SAID SOMETHING THAT CHANGED MY WHOLE LIFE!



REMEMBER THAT INTERNATIONAL CORRESPONDENCE SCHOOL'S ADVERTISEMENT YOU SAW THE OTHER DAY? I SAVED IT FOR YOU.

SAY! THAT'S AN IDEA—MAYBE I.C.S. CAN GIVE ME THE JOB TRAINING I NEED TO GET AHEAD!

I MAILED THE I.C.S. COUPON. THE FREE CAREER KIT I.C.S. SENT ME BY RETURN MAIL PROVED TO ME WHAT I.C.S. COULD DO.



THE I.C.S. COURSES SURE ARE PRACTICAL. I'M ALREADY USING ON THE JOB ALL THAT I'M LEARNING!

THE BOSS HEARD ABOUT MY I.C.S. COURSE. AFTER THREE MONTHS I GOT A GOOD RAISE—AND A LITTLE LATER...



I GUESS I WAS WRONG, FRANK. YOU'VE GOT WHAT IT TAKES. WE'RE GIVING YOU A PROMOTION. YOU EARNED IT, AND THE WAY YOU'RE GOING THERE'LL BE ANOTHER RAISE SOON!

I COULDN'T WAIT TO TELL THE FAMILY THE GOOD NEWS.



I GOT THE PROMOTION! AND ALL BECAUSE YOU SAVED THAT I.C.S. ADVERTISEMENT! MAILING THE COUPON WAS THE BEST MOVE I EVER MADE!



Any cure for spring fever?

SYMPTOM: Daydreams like this—

You feel a new warmth in the spring sun. A soft wind ripples the water. The gentle hum of your Evinrude is punctuated by the whirl of your reel.

Somewhere below, the "granddaddy" of this lake moves with a lazy rhythm.

Then it happens! The water erupts! You strike, reel in . . . every nerve geared to the taut line and the fighting demon on the other end!

That's spring fever. But, why try to cure it? Relax and enjoy it! Best way to do that is a trip to your Evinrude dealer.

Look at those gleaming new Evinrudes—from 3 to 75 hp! Ask about features that make them the finest fishing motors ever built . . . like thermostat-controlled cooling for longer engine life, smoother trolling . . . sound-sealed cushioned power . . . automatic choke for instant starts . . . full gearshift control . . . slip-clutch propellers Cruis-Throttle fuel economy. These are dream motors. But why dream? For a few dollars down you can make it a happy reality. Ask for colorful 1960 catalog. If you suddenly feel too lazy to go to your dealer—write EVINRUDE MOTORS, 4205 N. 27th Street, Milwaukee 16, Wis.

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